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approach

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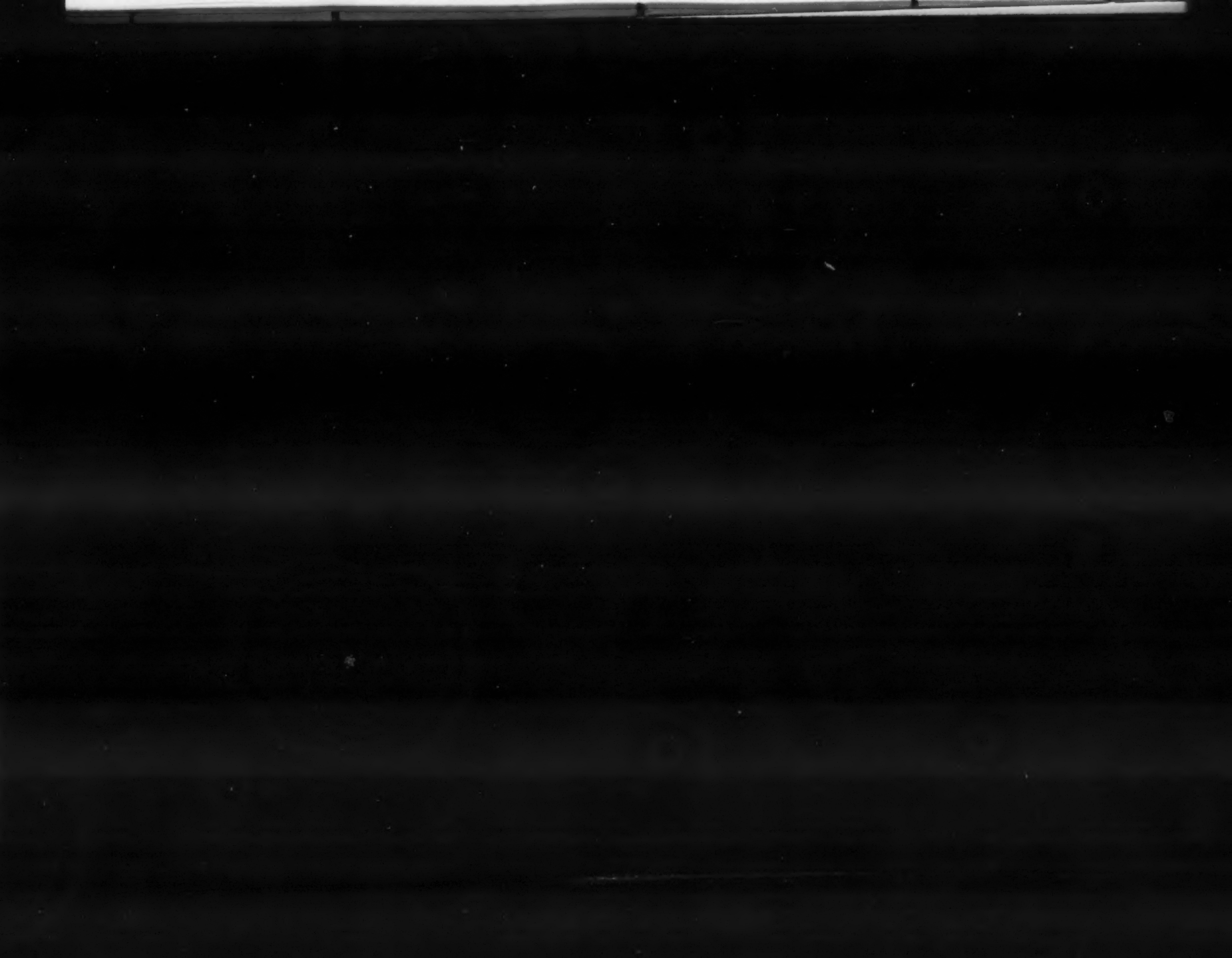
NAVY



SHORTCUTTING NATOPS DOESN'T PAY!

NATOPS procedures have been around for quite a few years now and, for the most part, are well accepted at all levels of operations. Unfortunately, however, this acceptance is still not *universal.* A considerable number of accident reports received by NavSafeCen list violation of NATOPS either as the primary cause or as a contributing cause factor.

In many cases NATOPS procedures prescribe flight techniques such as the degree of rotation to be used on takeoff and altitude required for flap retraction. Failure to comply with such techniques can and does result in aircraft accidents from time to time; however, we are not so concerned with unintentional deviations from optimum techniques in this article as we are with outright violations of the letter and spirit of NATOPS.

Sucking up the landing gear immediately after takeoff is an example of a NATOPS violation which appears to be indefensible. In one recent case this practice resulted in major damage to an F-8 when the aircraft settled back onto the runway after a premature liftoff.

In another case, premature retraction of flaps after takeoff resulted in the loss of an F-4B. Here's how it happened:

A replacement pilot and his instructor RIO briefed for an FCLP (Field Carrier Landing Practice) period. Preflight, start and taxi were uneventful. As the aircraft commenced its takeoff roll, both afterburners were lit almost immediately and the aircraft became airborne after about 1800 feet of ground roll. The nose attitude was normal to slightly above normal at liftoff and the gear and flaps were quickly retracted. The aircraft then pitched up and the right wing began to drop. At about 150 feet and 35 to 50 degrees angle of bank the RIO ejected. The aircraft reached a maximum height of about 175 feet, continued to roll right and lose altitude. The pilot ejected at less than 100 feet and 80-90 degrees angle of bank, outside the envelope of the ejection seat.

The RIO's chute opened and he landed in the grass 470 feet to the right of the runway, suffering minor injuries. The pilot, still in his ejection seat, struck the wooden frame of a hose support rack in a nearby refueling pit. The pilot survived but suffered major injuries. Subsequent investigation determined that the pilot's drogue and stabilizing chutes had deployed but his personnel chute was only two-thirds out of the pack at impact.

During the investigation which followed, it was determined that the aircraft probably had right wing down control instability; however, the board concluded that this control instability could have been overcome had the pilot not aggravated the instability by the premature retraction of flaps. Therefore, the board listed the pilot's premature retraction of flaps following a rapid rotation and steep climb after liftoff in violation of NATOPS procedures, as the primary cause for the loss of

control which resulted in the accident. The Board recommended that pilots give themselves every margin for safety in critical areas of takeoff and landing by rigidly adhering to the information and instructions in the NATOPS flight manual.

The cause of another accident which occurred recently could not be determined with certainty but it is suspected to have resulted from non-standard procedures followed by the pilot. In this case a KA-3B launched from a carrier for night carrier landing qualifications. The weather at this time was 600 to 800 feet overcast with visibility below the overcast 3 to 6 miles but no visible horizon. The top of the overcast was about 2000 feet.

After two uneventful landings and three launches, the KA-3B (then on final approach) was given a "Delta" signal by the ship because of fire in the cockpit of an aircraft on deck. The KA-3B was instructed to climb to on-top of the overcast. Shortly thereafter, the pilot reported "VFR-on-top at 2500 feet."

The problem with the aircraft on deck was expeditiously corrected and very shortly thereafter the KA-3B pilot reported VFR-on-top, he was cleared downwind and cleared to descend. He was told to report VFR below the overcast and when questioned about his altitude he reported "Passing angels two." The KA-3B was then instructed to "report VFR below the overcast" but this clearance was immediately amended to "Maintain 800 feet."

After the KA-3B reported VFR below the overcast, the pilot was instructed to descend to 800 feet. Shortly after this instruction was acknowledged, the aircraft was lost on radar and further attempts to contact the aircraft proved futile.

The Board was unable to determine the exact cause of this accident but in the absence of any other plausible explanation concluded that the most probable cause was that the pilot flew his aircraft into the water after having established an excessive rate of descent and failing to adhere to strict instrument procedures. This conclusion was based on calculations which showed a rate of descent in excess of 2000 feet per minute and upon interviews with squadron aircrewmen who had flown with the pilot in the past.

It was learned that the pilot showed an extremely strong drive and spirit of aggressiveness. He was always on the go. During FCLPs he consistently wanted to be first to taxi out, first to arrive overhead for each period, first to return to the chocks and always wanted to lead the formation.

This desire to be first apparently gave rise to the sacrifice of standard procedures. It was learned that at times this pilot disregarded NATOPS checklists and NATOPS procedures. Crewmen stated that he consistently started his aircraft without benefit of NATOPS prestart or poststart checklists. Also, contrary to NATOPS procedures, he had occasionally lowered gear and flaps simultaneously. In addition, during night FCLP he usually started his turn downwind very shortly after becoming airborne rather than climbing straight ahead to 800 feet as prescribed.

The most enlightening information uncovered concerned a series of actions the pilot took during a refresher period he had flown on the afternoon of the day of the accident. After an arrestment and a catapult launch he was given a "Bingo" signal. He cleaned up and began his climb but was told almost immediately to reenter downwind, land and to switch pilots aboard ship. At this time his aircraft was clean, climbing through 2500-3000 feet and accelerating through 250-260 knots. When told to reenter downwind, he simultaneously dropped his flaps and gear, in violation of NATOPS procedures, and began a port descending turn to enter downwind – all begun at about 3000 feet and 250 knots.

This information was considered valuable due to the fact that during the night qualifications an almost identical series of conditions prevailed with the exception that it was night and the descent had to be made through an overcast.

The pilot had completed two arrestments that night. On his third approach he received a foul deck waveoff. Following this waveoff, he was given instructions to "Delta." He climbed to VFR-on-top and upon arriving on-top was told to turn downwind, descend and report VFR below. This necessitated a left turn and descent and may have been assumed by the pilot to have included a transition to landing configuration.

The Board concluded that there was a distinct possibility that when told to turn downwind and report below the overcast, the pilot – in an effort to get on with the job – may have established an excessive rate of descent from which he never recovered.

Even the most experienced aviator, seniority notwithstanding, must realize that regardless of familiarity with a particular aircraft, area or procedure, established standards must not be compromised for expediency. When they are compromised, the pilot not only endangers himself but violates a trust placed in him which is based on his position and experience. *(We must consider that in spite of conjecture the accident potential in the above narrative is vividly real. – Ed.)*

Another accident which recently occurred off one of our carriers leaves little for imagination as to its cause. In this case the pilot was assigned as flight leader of a two-plane section of A-4Es on a ship-to-ship strike mission.

Takeoff was to be at dusk with a night recovery. The briefing, preflight, start and poststart checks were normal with no discrepancies noted by the pilot or maintenance personnel.

As the pilot taxied to the catapult, he actuated the horizontal stabilizer trim disconnect switch. The aircraft was spotted on the starboard catapult and the pilot's final check of the cockpit, pretakeoff checklist and engine instruments revealed no discrepancies; therefore, he turned on his external lights to signal readiness for launch.

At this point the only deviation from normal procedures was that with the throttle full forward, the pilot rolled the throttle friction full ON and, after turning on the exterior lights, *placed his left hand on the alternate ejection handle instead of grasping the throttle and catapult grip.*

Functioning of the catapult was normal with a recorded end speed of 141 knots and 34 knots wind over the deck. However, several witnesses later testified that the aircraft engine decelerated markedly during the catapult stroke.

After leaving the catapult the pilot rotated the aircraft by reference to his attitude gyro (AJB-3) since it was a dusk launch. The pilot later stated that the aircraft immediately encountered a stall buffet and that he lowered the nose of the aircraft in an attempt to alleviate the stall but this only caused the aircraft to settle. At this time the assistant air officer, who was observing the launch from Pri-Fly, transmitted "Keep her climbing" over the UHF on departure frequency. The aircraft continued to settle and the assistant air officer transmitted "Eject! Eject!" whereupon the pilot initiated ejection by pulling the alternate ejection handle with his left hand. Ejection occurred at an estimated 10 to 25 feet of altitude just prior to impact with the water.

The pilot suffered only minor injuries and was picked up by the plane guard helicopter and returned to the ship within a matter of minutes.

During the investigation it was determined that the pilot's performance in the carrier landing phase had

recently begun to deteriorate, particularly at night. His landings were below average, characterized by excessive power adjustments that were accentuated at night. A few days prior to the accident the squadron C.O. discussed the pilot's difficulties with the senior air wing LSO. The consensus was that the pilot's performance, though subpar, was tolerable and best remedied by working him through this bad period. Just after this discussion, and two nights prior to his accident, the pilot had been on the LSO platform and witnessed the fatal ramp strike of a fellow squadron pilot.

It was learned that on the night before his own accident the pilot had participated in a discussion with several other young air wing pilots on the various ways that pilots could be killed in carrier aviation. General agreement indicated that the catapult shot was the most likely cause of a fatality. The ensuing conversation included a discussion of possible preventive measures among which was the method the pilot elected to try the next night.

From interviews and the pilot's statement concerning his preparation for the catapult shot, it was noted that he failed to check, or could not recall, the EPR gage reading, engine RPM, fuel flow or approximate stabilizing temperature of his engine. While in the stall buffet after the catapult shot the pilot did not check his throttle position or engine instruments nor did he consider jettisoning 5000 pounds of external stores. During this sequence, from the catapult shot to ejection, the pilot kept his left hand on the alternate ejection handle; however, he does not believe that he would have ejected had it not been for the urgent prompting of the assistant air officer. Though the aircraft was airborne for approximately seven seconds, the pilot, upon recovery, was under the impression that he would not have had time to eject if his hand had been on the throttle during the catapult stroke.

Based on witnesses' statements that the aircraft engine definitely decelerated during the catapult stroke, the Board concluded that the most probable cause of this accident was the pilot's deviation from normal procedures and his violation of NATOPS procedures by locking the throttle at military power with the throttle friction lock and then placing his left hand over the alternate ejection handle vice grasping the throttle and catapult grip during the catapult shot. This allowed the throttle to be moved aft by the acceleration forces during the catapult stroke, causing the engine to decelerate. Once airborne the aircraft did not have sufficient thrust to sustain flight.

The Board recommended that continued emphasis be placed on the possible consequences of unauthorized deviations from established procedures, i.e., NATOPS and squadron/wing doctrine.

Although changes to procedures are vital and are solicited, they should not be tried until approved or until evaluation is authorized. In this instance the deviation was such that no possibility of approval is considered likely, yet the pilot willingly tried it with drastic results. The respect for, and adherence to, procedures should be given priority as goals in training programs. This accident vividly portrays that knowledge of proper procedures is not sufficient in itself.

An endorser to the aircraft accident report stated:

> "The totally unprofessional action displayed by an experienced pilot in this accident resulted in the loss of not only an $800,000 airplane but also a significant unit of naval combat capability. It is even more disturbing that a carrier pilot, whether experienced or inexperienced, should hold such erroneous impressions of pilot/aircraft actions and reactions during the catapult takeoff sequence.
>
> "Squadron commanding officers must frequently schedule drills, discussions and refresher training in aircraft systems, flight characteristics, NATOPS procedures and safety practices. Responsible seniors must continually assess pilot tendencies to deviate and must continually stress the incipient dangers of individual experimentation with established safety and NATOPS procedures. There are approved methods for effecting changes to existing procedures when adequate evidence for revision exists."

NATOPS is a positive approach toward improving combat readiness and achieving a substantial reduction in the aircraft accident rate. It is standardization based on accrued professional knowledge and experience. It provides the basis for development of efficient and sound operational procedures. If NATOPS procedures are found to be lacking in some particular, the answer *is not* to ignore or violate established NATOPS procedures but to propose appropriate changes.

Most things that are good are either illegal, immoral or fattening – EXCEPT NATOPS! ◄

When your mind is blank, turn off the sound.

Ace L.

If you have a question concerning any phase of instrument flight for which you cannot find a satisfactory answer, send it to Commanding Officer, VA-127, NAS Lemoore, Calif. 93245, who has volunteered to do the necessary research and supply the answers.

ON THE GLIDE SLOPE
featuring more Answers from Aggie

Question: What does the "X" following a communications frequency in the IFR Supplement indicate?

Answer: The IFR Supplement under "Radio/Navigational Data" explains that the "X" following a frequency indicates that it is not normally monitored and that monitoring must be requested from the listed control agency.

Question: What takeoff minimums must be observed for a formation flight when the flight leader has a special instrument rating and the wingman only has a standard rating? What is entered in the "Instrument Rating" blank on the DD-175?

Answer: Paragraph 331e of OPNAV 3710.7E states that a flight leader is not authorized to clear members of a flight in weather conditions below the minimums for the type rating held by individual pilots. Although OPNAV 3710.7E and Section II of the Flight Planning Document do not specifically state whose instrument rating will be entered in the "Instrument Rating" box of the DD-175, the inference in both is that the flight leader or pilot in command will enter *his* instrument rating in the box.

Question: I am flying an A-4 aircraft in IFR conditions on a radar vectored descent to 5000 feet for a GCA final approach to NAS Boondocks when I experience complete two-way radio failure. What should I do then, Aggie?

Answer: You are on what is commonly called a turbojet enroute descent and this is covered in the Emergency Procedures Section of the IFR Enroute Supplement. The proper procedure for the situation described is to proceed to the IAF originally filed to, at the last assigned altitude or the minimum safe altitude, whichever is higher, and execute the published approach. Since the minimum safe altitude published on an approach plate is only to 25 nautical miles, you should climb to the emergency safe altitude in all cases where the IAF is beyond 25 nautical miles from the facility being served.

Question: When am I cleared to descend to published IAF altitude after I've been cleared for an approach?

Answer: According to the Airman's Information Manual, page 1-58, when cleared for an approach the pilot "should begin descent to approach altitude as soon as possible." If there is some reason for not descending, ATC should be advised that you are maintaining your last assigned altitude. In any case, you *must* report when leaving your last assigned altitude.

Question: How is the flight plan void time computed for the DD-175?

Answer: First, the void time is only required on stopover (multi-leg) flight plans. Section II of the Flight Planning Document says to add all ETEs plus all planned ground time to the estimated time of departure (ETD). OPNAVINST 3710.7E limits planned ground time on all stopover flight plans to one hour. Do not confuse *flight plan* void time with *weather brief* expiration time. ◄

A Point For Discussion

The accompanying article was contributed by LT D. H. Ryder, VA-174 and endorsed by the C.O., VA-174, CDR J. E. Russ. Both the original article and the C.O.'s endorsement are presented.

The main thought in the article, i.e., that every field landing in a carrier type aircraft should be flown as if it were an FMLP appears to have considerable merit and we present the article (and the endorsement) as a point for discussion by aviators in other carrier units.

In many cases the only thing necessary to implement the suggestion contained in the article is the determination of an individual pilot to do it, but when we talk about every pilot making an FMLP on every landing, there are several considerations which rate consideration, e.g.:

- The continuous availability of a properly set-up mirror (location, light intensity, etc.)
- The likelihood that the traffic pattern past the 180-degree position would be somewhat extended and the differences in the type of pattern being flown by carrier type aircraft and non-carrier type aircraft using the same field.
- The effect the usual practice of landing on alternate sides of the runway would have on the value of practicing the carrier type approach.
- Special precautions which would have to be observed when landing at high gross weights, under certain wind conditions and on short runways.

What do you think about making *every* field landing in a carrier type aircraft the equivalent of a FMLP? Address your comments to the Editor, APPROACH, or correspond directly with the author.

Squeaking 'Em On

By LT D. H. Ryder, VA-174

DOES the sea/land column in your logbook show a lot of meaningless touch-and-go's or does that number represent valuable practice. If you are a tailhook aviator, you are wasting your time if every touchdown is not the result of an attempt to have a centered meatball, be on speed and on lineup. There are really only two kinds of approaches worth practicing – simulated carrier landings and precautionary approaches.

Even the precautionary approach is of limited value to a naval aviator faced with low oil pressure and with a ship being the only place to land. The airspeeds and sink rates involved in NATOPS precautionary emergency landings are well outside shipboard arrested landing parameters. At sea, there is only one way to land.

Landings on the beach, as anyone who has had to hold short waiting for clearance will tell you, cover a greater spectrum than the two possibilities stated above. On a VFR day at any one of our major air stations you can see many varieties, including those which appear to have been made by the well-known, striped-behind ape. This one sets his power downwind and drives into the groove holding the nose down with both hands. With a tally-ho on the runway, he takes a green grass cut and will (hopefully) land in the first 3000 feet of runway. Then there is the profile mission type landing. This pilot starts from a high, fast 180-degree position. Hacking the power to IDLE, he finds himself on an unauthorized low level in the groove. He usually has to arrest his sink rate with an application of MRT. He then describes this maneuver as "greasing it on."

The variety of landings is almost infinite and includes every technique from "cut and flare" to the standard NATOPS pass.

Flying an OK pass from a 1000-foot 180-degree position is not easy. There is the problem of intercepting the ball while trying to maintain airspeed and slowing a 1000 feet-per-minute rate of descent to a 300 to 400 feet-per-minute rate at the 90-degree position, then having to readjust it to a 600 to 700 feet-per-minute rate of descent in the groove.

With the slow engine acceleration characteristics of many of our fleet jet aircraft, this near-idle descent to the 90-degree position does not seem safe. And it isn't. The pilot must be constantly aware of just how far back on the power he is and just how much he will have to lead with power to stop the ball in the middle.

Admittedly, a 600-foot 180-degree position would be safer and would be much better simulation of a carrier approach. Unfortunately, we have to bow to noise abatement and other factors.

The fact that it is difficult to intercept the meatball under the conditions described does not release anyone from the obligation to get all of the training out of each hop that he can or the obligation of landing his aircraft in the safest manner possible.

There is no gage to perfect landings but here are some little discussed pointers for better field landings:

- Be on and trimmed for optimum angle-of-attack at the 180-degree position. Cross-check AOA with airspeed.
- Be no higher than pattern altitude at the 180-degree position.
- Extend sufficiently off the 180 to intercept the ball at about 450 feet of altitude.
- Reduce power to expedite descent to 450 feet AGL, being aware of your engine acceleration characteristics (descents at more than 1000 feet-per-minute are not recommended).
- Anticipate the power required to slow the rate of descent at the 90-degree position.
- Pick up the meatball, check lineup, angle-of-attack and fly it to the deck.

If, on preflight, you discover a tailhook on the aircraft, land it as if you were going to use it.

The commanding officer of VA-174, CDR J. E. Russ, in forwarding the above article for publication, added the following pertinent comments:

"The prime mission of every fleet squadron during its shorebased cycle is training. As we face ever-increasing austerity it becomes particularly critical that each minute of flight time be turned to profitable training. All too frequently a shorebased training mission is flown as if it terminated when the birds left the target rather than on shutdown in the chocks. That trip back to the break and, in particular, that minute or two from the break to touchdown is irretrievable training time – time no squadron pilot can afford to squander.

"Since the prime environment of a tailhook airplane is the carrier, its every operation should be performed accordingly. More and more deploying squadrons are finding that their time, availability and assets do not permit the length or intensity of pre-CQ bounce they would like to have. If that's all the FMLP that pilots are going to get before hitting the boat, it is not enough. But, every field landing can be an FMLP, as LT Ryder points out, and I agree that it most definitely should be.

"To enhance the effectiveness of this training I propose two procedures which fleet commands might find helpful:

"• Send your LSO (or the Air Wing LSO) to the end of the runway on a random and unannounced basis during recovery of your training missions to observe and record the landings. Have the LSO grade the passes as he would any FMLP. At your next APM, a review of these passes can be most helpful in encouraging pilots to make *every* pass 'into the No. 3 wire.'

"• The other recommendation is an old LSO technique which remains valid. More 4.0 passes are spoiled in the last 5-8 seconds of a pass than at any other time – most often by pilots 'spotting the deck.' In their FMLP passes, pilots should endeavor to note and, if necessary record on their kneepad, the clock code at which the ball appears to leave the mirror or lens. A 4.0 No. 3 wire pass has the ball leaving the mirror at 9 o'clock; a settle around 8 o'clock; and a 'climb in close' at 10 o'clock or more. If the pilot saw the ball go off the mirror and, therefore, could honestly report where it went off, he *was* watching the mirror to touchdown. Spotting the deck is a habit which is insidious and is reinforced every time a pilot makes a 'normal' field landing. Why build bad habits?" ◄

Short Snorts

An expert is a man who is seldom in doubt but often in error.
Gen. George Patton

Put The Pins In

NAVY Eastcoast Tower, this is Tigerpaw 671, what's the weather at the field?

Tigerpaw 671, present weather 700 overcast, visibility one mile in heavy rain, duty runway 4 Right, winds 060/15 gusting to 20, altimeter 30.06. Thunderstorm north moving northeast. Water on the runway.

671 Roger. I'm 15 miles southwest on the 220 radial. Request landing instructions. Desire GCA.

Tigerpaw 671, Eastcoast Tower, what's your altitude and are you VFR?

671. Affirmative VFR, descending, passing through 10,000 feet now.

Tigerpaw 671 is cleared for a GCA to runway 4 Right, no other traffic, switch to button 4 for GCA.

A few minutes later the A-4 rolled out on the runway, the pilot switched to Ground Control and requested clearance to the fuel pits. His request was denied. Fueling had been temporarily suspended until the thunderstorm moved further from the field. He was cleared to the squadron line and the plane was secured. Approximately one hour later the aircraft was towed to the fuel pits with a brake rider in the cockpit. The plane was refueled and towed back to the line. After the A-4 was parked and chocked, the brake rider attempted to exit the aircraft over the starboard side. He didn't bother to use a boarding ladder. His left foot became entangled and he stepped on the emergency canopy jettison handle located in the cockpit and the canopy abruptly departed the aircraft. Fortunately the crewman was not injured and the canopy, jettisoned from the full open position, cleared the aircraft by about 90 feet.

Twelve grand (price of canopy)! That's a pretty expensive parking fee to pay. Undoubtedly the brake rider learned a valuable lesson about how NOT to climb out of an A-4 and we hope all readers will take note. This was set up when the routine was broken. The pilot, instead of being able to taxi into the pits as was his custom, edged into the line. The combination of inky darkness, punctuated by distant lightning flashes and rain did not encourage him to linger. He ordered the plane captain to install the safety pins but the plane captain didn't want to stay out in the rain any longer than necessary and made a mental note to return later and perform that task. After the storm moved completely out of the area the plane captain remembered and cautioned the brake rider to ensure proper pin placement but again (for the third time) the pins *were not installed.* The brake rider was familiar with the cockpit, had been indoctrinated in the hazards of the ejection seat and was considered qualified. A comment by an investigator passed off the incident by suggesting design as being contributory because sometimes it is difficult to properly install the initiator safety pin in the proper slot and requires the pilot's full attention.

Design, nothing! Thirty lashes with a soggy noodle to a don't-care pilot for exiting the cockpit without performing his most important chore after getting into the chocks; 30 more lashes to the plane captain who didn't do as he was told and a final 30 lashes to the careless brake rider who tangled his size 10s after failing to heed the plane captain concerning the pins. Just who, in the name of all that's safe and holy, would ever have installed the pins if the brake rider hadn't fired the canopy? Someone else in the outfit could have been killed.

In his endorsement the C.O. didn't buy the innocent pleas either. Among other things there was a little dissertation on *responsibility* of pilots for ensuring all safety pins are installed prior to leaving aircraft – day, night, sun or rain – all of the time. It wouldn't be surprising if the word leaked out that in a certain squadron there was a team of three – one officer and

two enlisted men – who inspected all aircraft for installation of safety pins after each flight for a week.

What Was That?

BANG! Clunk! Grind! Whoosh! Pop! These types of noises are heard every day, somewhere in the world, by pilots and crewmen of helicopters. Unusual noises above the din and cacophony of helicopter sounds are, surprisingly enough, rather easily heard and frequently mean trouble.

What kind of trouble? The kind that generally calls for shutdown if on the deck, or landing as soon as possible if airborne. The following short descriptions illustrate a few typical "noisy" examples.

- When the aircraft, an SH-3D, became airborne and commenced a port turn a loud noise was heard. The engine cowling was open.
- As the lead aircraft of a flight of four CH-46s was climbing out a whoosh was heard. The copilot's escape hatch had come out of its frame and fallen from the helo.
- During flight an unusual noise was heard in a CH-46 and the pilots felt a severe beat develop. Two yaw SAS (Stability Augmentation System) links and the pilot valve of the lower (roll) boost actuator had to be replaced.
- On takeoff a pop was heard in a UH-1E. The port transmission cowling was loose and had contacted a main rotor blade.
- After a practice troop insert, the pilot of a CH-46 heard a kind of whistling sound. Torn pockets and wrinkles over half the length of all three aft rotor blades were discovered.
- While climbing to altitude the crew of an SH-3A heard a loud grinding noise. Extensive damage to compressor stator blades, inlet guide vanes and first stage compressor blades of one engine was discovered.
- Prior to takeoff the crew chief of a CH-46 heard a loud bang from the aft pylon area. Later the blower driveshaft was found broken, flex plates were torn loose and the shaft was lying adrift in the compartment. Other damage included holes in the airframe, the deck assembly broken in one place and cracked in several more places, a stringer broken, the oil cooler duct assembly damaged and indications of aft transmission overheating.

Those *unusual noises* should not be treated lightly, should always be investigated and should never be disregarded.

Postflight Inspections Are Important

A FLIGHT of two A-4s made an authorized low-level navigation flight from their home station to another base. After refueling, the flight took off for the return flight to home field. While enroute, the pilot of one of the A-4s saw a small bird hit his center windscreen. He noted no variation in aircraft performance and elected to continue the flight as planned. Upon arrival at home base he performed a simulated tacan approach and several touch-and-go's prior to completing the flight.

After shutdown in the chocks the pilot failed to perform a postflight check of the aircraft. He also failed to make any notation on the yellow sheet regarding the bird strike.

Fortunately, the next pilot assigned to the aircraft *did* complete a careful preflight inspection of the aircraft. This inspection revealed bird remains on the eight o'clock position of the port drop tank, bird remains at the eleven o'clock position of the port intake duct and also on the inlet guide vanes. This indicated a collision with at least two and possibly three or four birds.

The engine was subsequently removed for inspection. During the inspection, bird remains were found back to the fifth stage of the compressor. FOD had occurred beyond acceptable limits from the fourth to the seventh stage. However, the FOD appeared to have been caused by small hard objects such as metal nuts or small bolts and probably occurred at some time prior to the ingestion of the birds.

The big point to be made here is that the pilot on the first flight should have completed a postflight inspection of the aircraft, particularly after experiencing the bird strike and written the incident down on the yellow sheet. Moreover, it appears that the plane captain who subsequently preflighted the aircraft was something less than thorough. If the next pilot had been equally careless in his preflight inspection it is entirely possible that the engine could have failed during the ensuing flight.

Postflight inspections are important. Give them the attention they deserve.

MECH Available By Subscription

Beginning with the Summer '69 issue, MECH, the magazine for naval aircraft maintenance and support technicians, became available to the public through private subscription. Industry, publishers not on the Exchange List, Reservists and others having a need for personal copies may order the magazine from the Division of Public Documents, Government Printing Office, Washington, D.C. 20402.

Subscription rates: Single copy, 75 cents; 1-year (4 issues) $3.00.

T-28 OVER-STRESS

TWO NAVAL aviators took off from their home field for a NATOPS check flight. The first pilot (check pilot) was in the rear seat and the pilot to be checked (second pilot) was in the front seat.

The second pilot made the takeoff and commenced climbout. Upon reaching 10,000 feet, the second pilot executed a spin to the left. Altitude loss was about 3000 feet. Upon completion of the spin, the pilot climbed back to 10,000 feet and executed a spin to the right. Both maneuvers appeared to be normal and no unusual forces on the aircraft were noticed by either pilot.

Following the two spins, the second pilot executed two aileron rolls. The first pilot then took control of the aircraft and started to return to the field in order to perform practice emergency landing approaches. At this time, the second pilot requested the first pilot to demonstrate some high speed stalls. The first pilot then returned to the area where they had been practicing the spins. He lowered the nose of the aircraft to gain airspeed. At an altitude of about 6000 to 7000 feet and at 200 kias, the pilot banked the aircraft 90 degrees to the right and applied back stick pressure. The aircraft started to buffet and at this time the pilot felt the stick "pop" back. He immediately released the back pressure and the aircraft rolled to the left in a lazy roll through about 180 degrees. The accelerometer indicated 6.2 G.

Following this maneuver, the second pilot tried the same maneuver to the left. Five point seven G were applied this time and as the aircraft entered the buffet it rolled slightly to the left but again no unusual forces were felt by either pilot.

The aircraft was then flown back to home field where two practice emergency landing approaches were performed by the second pilot. The first approach was to a waveoff and the second to a touch-and-go landing. Shortly after completing the touch-and-go, the pilots were notified by observers on the ground that *the entire port horizontal stabilizer and elevator* were missing (see photo). They immediately turned downwind and made a final landing.

Postflight inspection of the aircraft revealed that the stabilizer/elevator had departed the aircraft in an upward direction initially, then aft. This was indicative of positive load forces on the tail as a result of negative G or a rapid unloading of positive G on the aircraft. The manufacturer's representative also inspected the aircraft and agreed with the accident board's assessment that the aircraft had been overstressed due to negative G or an instantaneous unloading of positive G.

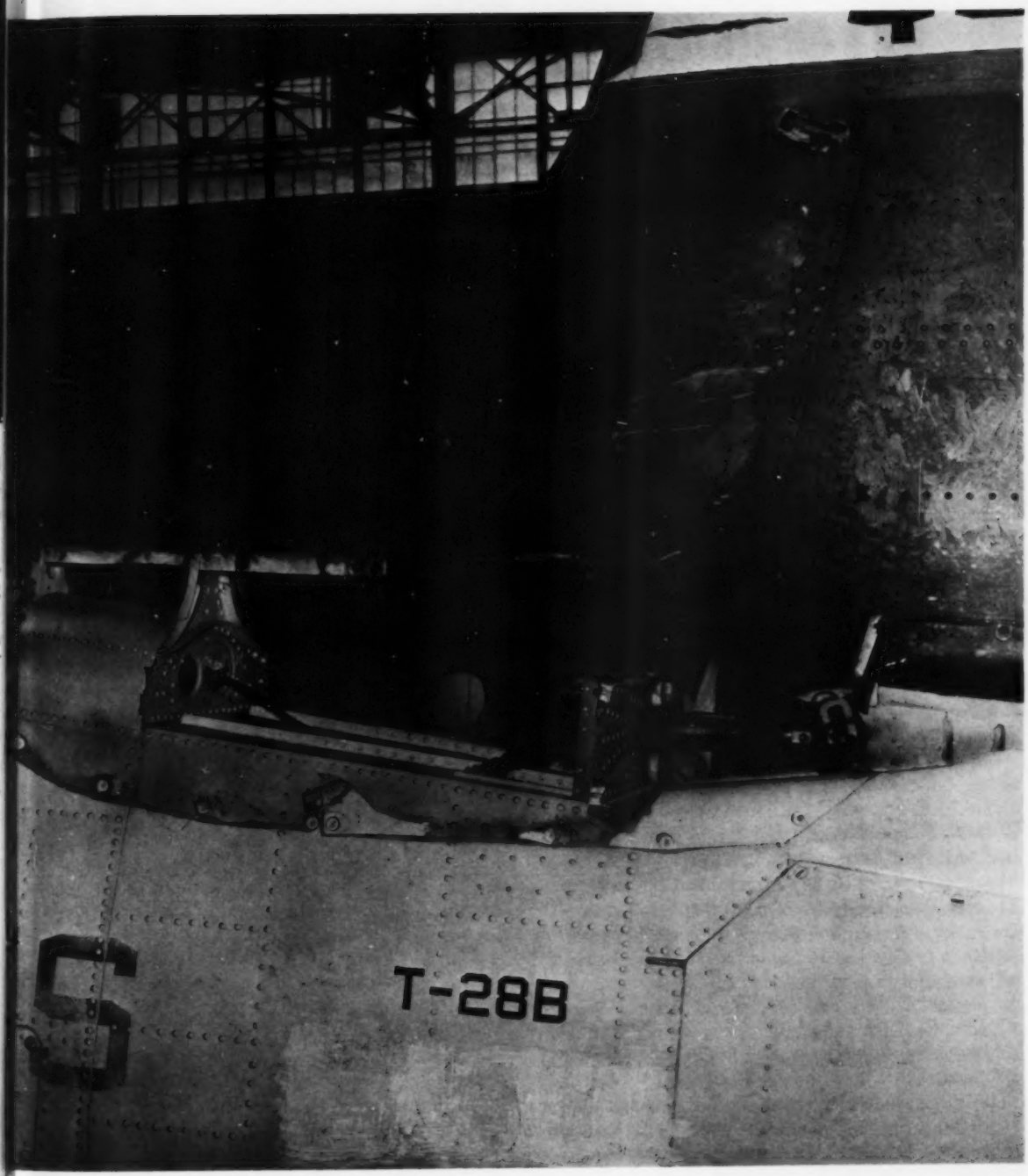
The performance of either of the two high speed stall maneuvers (with about 90 degrees bank at 6.2 and 5.7 G and 200 knots) exceeds the operating limitations of the aircraft. The T-28B/C NATOPS manual states:

"Because rolling pullouts impose additional stress, maximum permissible acceleration during rolling pullouts is two-thirds the maximum permissible acceleration for a normal pullout. At indicated airspeeds between 170 and 210 knots, critical combinations of acceleration and buffet can cause overstress. In clean configuration, the maximum permissible acceleration for flights in smooth air (dynamic stall line) is 5 G at 170 kias and 6 G at 210 kias, varying linearly from 170 to 210 knots as shown in Figure 1-27 of the T-28 NATOPS Manual. Stick back-pressure should be relaxed at onset of buffet in the 170-210 knot airspeed range."

The accident board concluded that this particular aircraft had been overstressed by at least 2 G during the high speed stalls. This initiated the stabilizer/elevator failure. The pilot's failure to release back pressure at the onset of buffet in the 170-210 knot region and his subsequent abrupt forward motion of the stick when he felt a "pop" caused a rapid unloading of the high G forces on the aircraft. This caused the stabilizer/elevator to depart the aircraft in a fashion typical of a negative G overstress.

As a result of this accident the squadron has initiated a training program which demands continuous study and review of the NATOPS manual by assigned pilots.

Know the limitations of your aircraft and adhere to them. It will pay off in the long run. ◄


T-28B

U.S. AIR FORCE

Crusader Crisis

EVER so often in the aviation safety business you run across an aircraft accident that appears to be the culmination of a series of events, failures, circumstances and errors which just couldn't happen – but did. This is the story of one such happening which began innocently enough but terminated in a manner that suggested the pilot of the DF-8F had the proverbial black cloud hovering just above him during most of the latter portion of his flight.

On climbout from a far east air base, the pilot learned that his IFF/SIF was not being received by Departure Control. This fact, if discovered prior to launch, would have been reason enough not to take off but not sufficient reason to terminate the flight once airborne. Until the pilot arrived at his initial approach fix the flight was quite routine. Sometime before arriving at the fix he had discovered that his ARA-25 (UHF/ADF) was inoperative. It was noted in the analysis of the accident that by not checking the UHF/ADF on the ground the pilot had deviated from F-8 NATOPS. However, the Board felt that if the pilot had found it to be inoperative on the ground, he still would not have aborted the flight. In the NATOPS manual there is no prohibitive go-no-go criteria pertaining to the ARA-25.

The flight was strictly routine until shortly after the pilot commenced a tacan approach at homeplate. He departed 16,000 feet at 1152 with 2400 pounds of fuel remaining. Approach Control advised that radar contact was established. After reaching 10,000 feet the pilot was advised to hold at 12,000 feet as the field was temporarily closed because of a field barrier engagement. He was advised that the field would be open in about 15 minutes. After this transmission the F-8 pilot told Approach Control that he would be "minimum fuel" in 15 minutes and if the field was not open at that time he would request a radar vectored enroute descent to another nearby airfield. At 1154 Approach Control cleared the F-8 to return to 16,000 feet and hold at his original approach fix. The pilot rogered, broke off his approach and commenced a climbing right turn indicating 2000 feet per minute rate of climb at 250 kias.

At this time the "black cloud" must have been hovering just above the cockpit because the situation

started to tighten up. The pilot stated: "... I noticed my airspeed was about 300 kias, my VSI was about 3000 fpm down, with a constant angle of bank on my VGI. At this time the OFF flag in the VGI appeared and I realized that I had lost that instrument." (At this point our pilot was without a transponder, had an inoperative UHF/ADF, no VGI, was not in radar contact – and also was getting a chance to practice his partial panel unusual attitude recovery technique under full instrument conditions!)

We continue. "... I slowly leveled my wings using the RMI and needle/ball and climbed on partial panel to VFR on top. I also gave Approach a call and told them I had lost my main gyro, *was declaring an emergency and requested they get someone up to bring me down...*" (His exact words taken from the Approach Control tape were, "... I'm declaring an emergency. I've lost my main gyro and I do not have a backup. Can you get someone up here to bring me down?"

"My fuel was around 2300 pounds and I started looking around for holes and waiting for Approach Control to realize I was a NORDO . . ."

The pilot continued: "Approach came up and asked if I wanted them to launch the F-102s and told me he could give me a straight-in-no-gyro approach to (the nearby airfield). Figuring he thought I had lost my RMI, knowing what an absolutely rotten partial panel aircraft the F-8 is and realizing that when the visibility at homeplate was reported as three miles in rain showers, it is only one mile in our F-8s because of a poor rain removal system, I keyed the mike to tell him that I would take the F-102s. *It was then that I found my transmitter had gone out.*" (Exit another important piece of communications equipment at a rather inopportune time. Black cloud still appears to be hovering above.) The time of this occurrence was 1155 – less than four minutes from the time the initial approach began.

Approach Control made numerous additional attempts on the last frequency used, in addition to guard, in an effort to reestablish contact with the F-8. This consisted of 18 transmissions during the next 17 minutes until at 1212 Approach Control made the last attempt at a radio check on guard and from that time on conducted routine control of other traffic only.

Meanwhile, our pilot, who had heard all of Approach Control's transmissions but could not answer, was attempting to get his RT-60 radio out of his survival vest in a last-ditch effort to communicate with someone – anyone! He stated, "... My fuel at that time was around 2300 pounds and I started looking around for holes and *waiting for Approach to realize I was a NORDO* and request I turn to such and such heading, if I read them, for positive radar contact. I remained up on Approach frequency while looking for some holes to let down through and also tried to troubleshoot my radio by bypassing the seat pan and using my lip mike. Needless to say these attempts proved futile. I then switched to (the adjacent airfield) tacan because I was toying with the idea of heading straight in to that field. I had just heard a radio report that their weather was six miles with about 3500 foot ceiling. While waiting for the tacan to lock on, I finally succeeded in pulling out my survival radio, took off my helmet and attempted to contact someone on guard. The cockpit noise was bad and I couldn't tell for sure if the radio was working or not. I went ahead and transmitted a 'Mayday' in the blind, informed them *that my receiver was still operating* and requested a straight-in to the field.

"I then put my helmet back on and put my survival radio back in my vest. My fuel was now down to 2000 pounds and the situation was looking bleaker by the minute (no doubt influenced by the proverbial black cloud). By this time I surmised that Approach had forgotten about me because they hadn't tried to contact me for some time. My tacan had locked on (the nearby airfield) bearing 300 degrees with intermittent DME. Because of the driving around I had done looking for holes and all the troubleshooting in the cockpit, I didn't question the bearing. There were two big reasons that prompted me to consider shooting a partial panel approach to the field. One was that Approach Control always seemed to handle Navy tactical aircraft in a rather cavalier fashion. Even though we have the least fuel on hand and the least navigation equipment, we can usually count on getting cut out of an approach pattern by a civil carrier or some other heavy. This method of handling us had already contributed to the loss of one of our F-8s last year. The second was my lack of faith in the F-102s ability to find me. This I felt was supported by the fact that last year they were sent out to get one of our F-8 pilots in a situation similar to mine. He picked them (F-102s) up visually as they flashed by him with what he described as 'heads in the cockpit.' He turned, in hope that he would see them turning back to him, but they just kept on going. He was more fortunate than I; he later found a hole and got back VFR with little fuel to spare. With these thoughts in mind I elected to penetrate."

At this point in his flight, the Accident Board stated

in their analysis: "Paragraph III, A.8 on page 95 of Section III, FLIP Planning states: Climbing or descending under IFR conditions within controlled airspace is not permitted, except in emergency. This pilot had *no IFF, ARA-25, VGI, tacan or UHF transmitter.* He had 2000 pounds of fuel; he had declared an emergency and requested intercept, but no one would talk to him in a manner to which he could respond. If he was not in emergency conditions then he never would be! Consciously or unconsciously he was mentally disposed toward a course of action predetermined months before. LT . . . is not a man to take the experience of others lightly. He knew that not quite a year ago a squadron mate was committed to leaving his fuel-starved F-8 within minutes of landing at first (homeplate) and then (alternate airfield) due to prolonged careless handling by Center and Radar Approach Control. (He also knew of the previously related incident wherein another squadron mate failed to be intercepted.) Should he spend time and precious fuel flying patterns in the sky awaiting salvation that by the sound of his radio was not forthcoming? Not likely! He had changed tacan channels. The tacan appeared to be locked on. The DME had yet to settle down and the bearing was somewhat strange; but he had been inattentive to time and heading while troubleshooting, hole hunting and trying to make his personal survival

radio work. It was unfortunate that he did not identify the tacan channel before penetrating." (This was one of the few things that the pilot did or did not do for which he could be criticized. Whether or not a correctly identified tacan station would have made any significant difference in the ultimate outcome of his flight is strictly a matter for conjecture. The Board did not feel it would have changed the final result.)

Now let us return once more to the pilot as he started his partial panel descent on what he hoped was a straight-in tacan bearing to the field. "I crosschecked my RMI and wet compass, turned to a heading of 300 degrees, set the power at 80 percent, tickled the boards out and started a 250 kias, 2000 to 3000 fpm descent. The VSI and RMI proved to be the best instruments in the descent. I broke out VFR underneath about 500 feet AGL and drove along for about five minutes. The island I was looking for was nowhere to be seen and I then noticed the bar in the window of the DME. A quick check of the tacan established it was now inoperative and I had no idea how long it had been. (The black cloud was still with him.) Again checking my RMI and magnetic compass, I reversed course and drove for about five minutes at 500 feet in hope of picking up the island or any of the surrounding islands. This proved to be futile and I decided to climb back to VFR on top in hopes that I would be picked up on radar and possibly be intercepted. *Interceptors were now my only hope!* By the time I reached VFR conditions on-top I had about 1100 pounds of fuel. Because of the way my gear failed and the fact that I still had some a.c. and d.c. equipment left, I elected not to drop the RAT. I already had that tow reel costing me extra fuel and my concern now was to stay aloft as long as possible in hopes that someone would see me prior to flameout and report my position.

"During this time I flew left hand triangles and went through rechecking all my equipment, including extra mikes, headsets and RT-60." The Board noted that he could have flown right triangles indicating he had a receiver only but by flying left triangles he indicated he desired intercept, which he desperately did! "I also switched back and forth on various channels to see if anyone was looking for me.

"At about 600 pounds of fuel remaining I started to prepare for ejection. This simply consisted of body positioning, strap tightening, knee-board removal and helmet and O_2 mask security. By this time my throat was really dry. I was thinking, there was no sun down there – I was thirsty, I would not be able to deploy and use the solar stills, it was cold and it was going to get colder that night and nastier and I was already trying to work all this out of my mind. By this time I had reached a euphoric state. But I had to eject so I was no longer in a panic, I was actually relaxed and I did everything in preparation. At 300 pounds I dropped the RAT to insure control of the aircraft after flameout. I did not energize the emergency generator because I did not have an overall electric failure. At about 100 pounds of fuel, I spotted an F-102 below me at about my 10 o'clock. I added full power and pushed the nose over and dived after him. He started a right turn and I turned to cut him off in standard CV rendezvous fashion. About halfway through, the engine flamed out but I continued to press the rendezvous because I wanted to make sure he saw me prior to my ejection. I pushed my nose over more to keep my speed up and just as he was about 2000 feet ahead of me, I noticed another 102 had pulled alongside of me. I then leveled the wings and pulled the nose up, motioned the 102 to move away, assumed the best body position I could (because of my sitting height I have to slouch to allow clearance for the curtain in the DF-8s, even with the seat full down), slowed to about 150 kias and ejected."

Survival Aspects

The pilot stated that after his ejection the opening shock was like nothing he had ever experienced before and was the worst part of the escape sequence. During parachute descent he removed his oxygen mask, inflated his LPUs (water wings) and deployed his raft. He felt that deploying the raft when he did was a mistake

because of the extreme chute oscillation it set up. He removed his gloves and located the release fitting in preparation for water entry. Impact with the water was exceptionally hard. After releasing the fittings he was free of the chute except for one shroud line which he cut with his shroud cutter.

He got into his raft, removed his helmet and took his survival radio out once more. At this time he discovered the battery was loose. Everything came in loud and clear if he held the battery against the contacts with one hand and pushed the transmitter button with the other. He was then able to communicate with the orbiting F-102s. They informed him the rescue helo was on the way and was able to home in on his radio beacon. To further aid the helo, the pilot lit a smoke flare and verbally vectored the SAR pilot to his position.

The SAR pilot stated, "LT . . . did an outstanding job during the rescue operation. He followed established rescue procedures by jettisoning his parachute canopy to avoid entanglement, using his radio judiciously in not cluttering the frequency with useless chatter, turning on his emergency beeper when requested and igniting a smoke flare at the best time to effect his pickup. He left his raft just prior to the helicopter's coming to a hover over him and entered the rescue device and helicopter in the proper manner. We must stress that his proper use of emergency radios and smoke flares were the two factors which contributed most to his speedy and safe recovery."

Thus ended this soggy saga of an almost unbelievable series of material failures of navigational and communications equipment. Fortunately the pilot was rescued uninjured – the influence of the black cloud apparently left him once he ejected.

Analysis of Controller Action

In analyzing this accident the Board noted several procedural errors in the handling of this aviator's emergency. The pilot advised in his transmitter's last breath (1) the nature of his difficulty, (2) declared an emergency and (3) requested interceptors to bring him down. At this point, actions of supervisory and other personnel compounded the difficult circumstances under which this accident occurred. When questioned by the Board, the controller stated that he ordinarily would have requested the pilot to squawk a certain code but he had already determined to his (the controller's) satisfaction that the F-8's IFF/SIF was inoperative. The next step should have been to turn the aircraft to a specific heading for positive identification and check for normal receiver operation. But the controller had already mistakenly assumed that the pilot's transmission had meant loss of directional gyro with no backup. Therefore he felt the pilot had no compass on which he could take a turn and come to a heading. Nevertheless, the controller could have given a simple right or left turn and accomplished the same end. What the controllers, as a group, were unaware of was that every military aircraft has a standby magnetic compass. Although its use is not nearly as simple in turning to headings as an RMI, it would have served very adequately in this emergency.

Another point the Board pursued was the answer to the obvious question "why weren't the interceptors launched?" When the F-8 pilot requested an intercept, the controller who was handling him was also in the act of handling four or five other aircraft (well within his capability). The controller told his immediate supervisor that an F-8 had requested an intercept. From this precise point on there was a "communications gap" in that this request was never relayed to the watch officer supervisor or ADCC (Air Defense Control Center), the agency responsible for launching the interceptors. The fact that the interceptors were launched was not as a result of the pilot's request but because ADCC received positive indication on radar of an aircraft in distress (flying left triangles) and decided to investigate on their own. The F-102s were airborne at 12:28 – *an incredible 33 minutes after the pilot initially requested an intercept!*

Once the interceptors were airborne, the coordination between all agencies concerned (tower, CERAP, GCI and ADCC) was outstanding. The F-102 pilots were commended for their professional performance.

In retrospect, based on hindsight and how efficient the F-102s made the intercept, if the human error could have been eliminated, i.e. failure to notify ADCC of the intercept request, this accident would not have occurred.

The primary cause of this accident was recorded as material failure of navigational communications equipment with Approach Control as a contributing factor.

It seems that some days nothing goes right! ◄

MINGO JUNCTION A.C.
M

MOWER SAFETY TIPS

There is an old saying that goes along with this particular time of the year –
He who carelessly his front yard mows,
Can rapidly come up short on toes!

THE POINT BEING, it's that time again when a young man's fancy, etc. etc. In other words, you can almost hear the grass growing, it's sprouting so fast. So 't'would appear that a few safety tips on the operation of power lawn mowers might be in order. No computer statistics are available to list the number of mower accidents that occur per annum, but it goes without saying that folks *do* get hurt doing yard work. The following information, if used, can help to prevent such occurrences:

- Inspect the area to be mowed before beginning. Clear the grass of stones, wire, glass and other debris which may become missile hazards.
- Keep all small children, pets and *your* feet and hands clear of mower moving parts when starting.
- Wear shoes of some sort, preferably safety shoes. *NEVER* operate a power mower when barefooted.
- Keep in step with the mower. If you lag or let it pull you, you won't have full control over the machine.
- Always be sure of your footing on inclines. The steeper the slope the more care is required, especially if the grass is damp. Don't pull a mower towards you down an incline; mow *across* the slope.
- Excessive cutting speed of the mower blade is dangerous – don't overspeed the engine by tampering with the governor.
- Never permit small children to operate a power mower. They may be smart enough but lack the physical strength necessary to handle the machine.
- Learn to disengage the clutch or stop the motor quickly in an emergency. Always secure the motor when leaving the mower.
- When grass is wet or it's raining, do not use an electric power mower. Also, make sure an electric mower has its frame grounded through the cord.
- Disconnect the spark plug wire on the mower whenever working on it or unclogging the blades.
- Don't refuel a mower when the engine is hot. Also allow the mower to cool before storing it and insure that it is stored in a well-ventilated area.

These guidelines will insure you two things: a nicer looking lawn, and the right number of fingers and toes. Give 'em a thought.

GROUND EFFECT

Courtesy
Talon Service News
Northrop Aircraft
April Quarter 1970

Although the Navy does not operate the T-38A *(Talon)* aircraft, it is felt that the material presented has general application to many Navy aircraft that are presently in the inventory. For one instance in which ground effect was an important factor in preventing a night ditching see page 22 of July 1970 APPROACH.

NOT TOO long ago, a pilot of a twin-engine jet, unable to start the second engine and confident of its excellent single-engine performance, attempted a single-engine takeoff. Rotation and liftoff were a little premature for single-engine flight. Climb was established and the landing gear handle raised. As the landing gear doors opened to permit the gear to retract, the aircraft began to settle. A few moments later, the jet touched down beyond the overrun and began to shed parts. Fortunately, the pilot was thrown clear and sustained only minor injuries.

It is possible to fly an aircraft a few feet above the ground at a slightly slower indicated airspeed than that required to sustain level flight at a little higher altitude. This is the result of a phenomenon called *ground effect* which is better known than understood by many pilots.

When an airfoil such as an aircraft wing is producing a lifting force within a wing span above the runway, the downwash characteristics are altered, resulting in a considerable reduction in induced drag. This ground effect is due to the interference of the earth's surface with the airflow patterns about a wing in flight. Compression of air between the wing and the ground is a factor, however this does not completely explain the effect.

As the airfoil approaches the surface, the wingtip vortices and downwash velocities are increasingly reduced and at touchdown they are almost completely canceled out. The reduction in wingtip vortices and downwash velocity is primarily due to stopping of the vertical air component by the surface or ground. As a general rule, the results of ground effect can be detected and measured up to an aircraft altitude equal to about one wing span above the ground.

This can be illustrated by the "image system" of placing a hypothetical upside-down wing the same distance below the ground as the actual wing is above the ground. Any downwash velocity components of the aircraft wing are then offset by the equal upward components from the image wing, establishing a condition of zero velocity in the ground plane.

As the aircraft wing nears the ground, the strength of the wingtip vortices and the downwash angle are

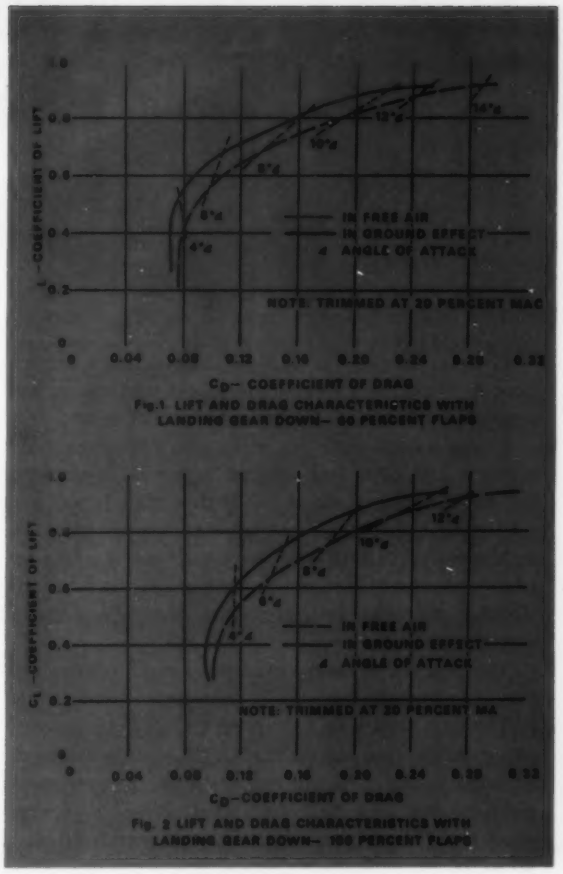
decreased for a particular amount of lift being generated. This reduction in downwash near the ground is reflected in a lowering of the induced drag and an increase in lift for the same angle-of-attack. What this means to the pilot is that he is obtaining the same lift at a smaller angle-of-attack and less induced drag, as illustrated in Fig. 1 and 2.

For example, with an airplane weight of 11,000 pounds, at takeoff velocity the reduction in angle-of-attack required is approximately 24 percent due to ground effect. As you recall, about two-thirds of the drag on the *Talon* during minimum speed operation in free air is induced drag produced by the high angle-of-attack required to sustain flight at this slow speed. However, when the T-38A descends to a point very close to the runway, the induced drag will reduce from 56 percent to 50 percent of the total drag. This factor increases the effective lift-to-drag ratio by about 24 percent, making possible flattening of the glide path and extending the glide distance following the flare to landing.

Ground effect also assists in cushioning stall-type landings and in operating from soft or rough airfields. The procedure for operating from the latter is to place as much of the aircraft weight on the wings as possible during ground run and lift off with the aid of ground effect before true flying speed is attained. It is then necessary to reduce the angle-of-attack gradually until normal flying speed is attained before attempting to climb above the ground effect area. You should keep in mind that the aircraft must have excess thrust available to climb out after it becomes airborne. If the aircraft is airborne at too low a velocity it may be so far back in the area of reversed command that no excess thrust will exist upon leaving the area of ground effect.

An airspeed indicator is not fully reliable in ground effect. It indicates a slightly higher airspeed as you are leaving the ground effect area and a slightly lower airspeed as you enter the ground effect area.

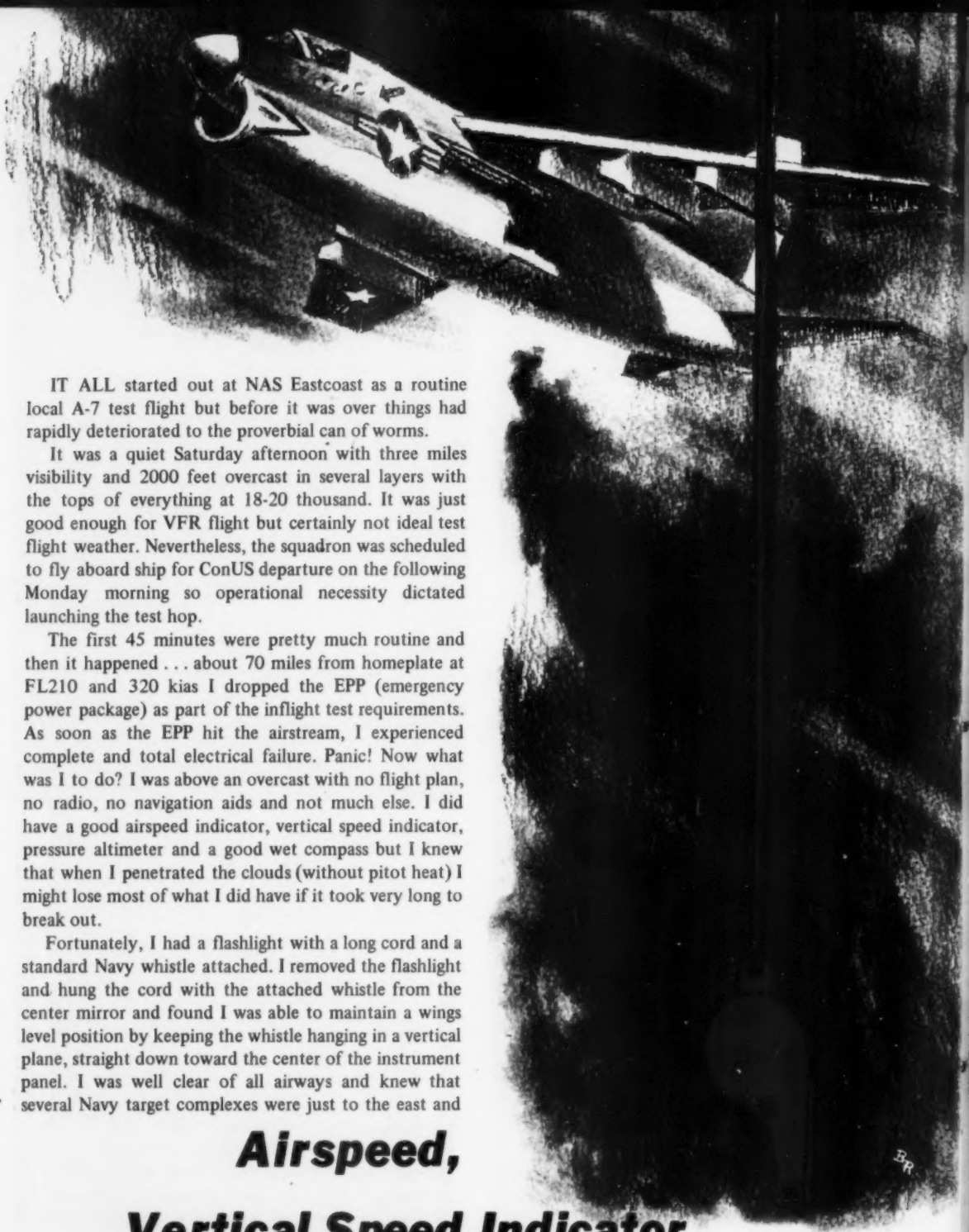
Ground effect also changes the horizontal tail effectiveness and, therefore, becomes a major factor in establishing the forward CG (center of gravity) limits of any aircraft. (The lower the percent MAC [Mean Aerodynamic Chord] value, the farther forward the CG is located.) More horizontal tail deflection is required to obtain a certain value of lift coefficient as the CG is moved forward. More horizontal tail up deflection is required in ground effect because the wing downwash angle is decreased and partially deflected upward against the horizontal tail by the ground surface. It will require several more degrees of horizontal tail up deflection to obtain maximum angle-of-attack just prior to touchdown as compared to free air flight.


C_L – COEFFICIENT OF LIFT
C_D – COEFFICIENT OF DRAG
IN FREE AIR
IN GROUND EFFECT
α ANGLE OF ATTACK
NOTE: TRIMMED AT 20 PERCENT MAC
Fig. 1 LIFT AND DRAG CHARACTERISTICS WITH LANDING GEAR DOWN— 50 PERCENT FLAPS

C_L – COEFFICIENT OF LIFT
C_D – COEFFICIENT OF DRAG
IN FREE AIR
IN GROUND EFFECT
α ANGLE OF ATTACK
NOTE: TRIMMED AT 20 PERCENT MA
Fig. 2 LIFT AND DRAG CHARACTERISTICS WITH LANDING GEAR DOWN— 100 PERCENT FLAPS

Another thought to keep in mind: If your aircraft (any type) has sustained in-flight structural damage, and you have satisfactorily accomplished a simulated landing in free air, remember that ground effect reduces the elevator or horizontal tail effectiveness. Plan your approach and landing maneuver so as to use less horizontal tail than that required during the free air check.

Floating during landing is, in part, a result of ground effect. The aircraft will continue to remain airborne just above the surface at a speed which would have resulted in an immediate stall at a higher altitude. A pilot's misunderstanding of ground effect has no doubt contributed to a number of barrier engagements. The ground effect is always there; it will help cushion your landing, prolong your glide and permit additional time to improve your landing attitude, but seldom allows enough time to recover from a "balloon effect." The most serious of these factors is that it is possible to get an aircraft airborne with insufficient excess power to sustain flight outside the area of ground effect. ◄



Airspeed, Vertical Speed Indicator and Whistle

IT ALL started out at NAS Eastcoast as a routine local A-7 test flight but before it was over things had rapidly deteriorated to the proverbial can of worms.

It was a quiet Saturday afternoon with three miles visibility and 2000 feet overcast in several layers with the tops of everything at 18-20 thousand. It was just good enough for VFR flight but certainly not ideal test flight weather. Nevertheless, the squadron was scheduled to fly aboard ship for ConUS departure on the following Monday morning so operational necessity dictated launching the test hop.

The first 45 minutes were pretty much routine and then it happened . . . about 70 miles from homeplate at FL210 and 320 kias I dropped the EPP (emergency power package) as part of the inflight test requirements. As soon as the EPP hit the airstream, I experienced complete and total electrical failure. Panic! Now what was I to do? I was above an overcast with no flight plan, no radio, no navigation aids and not much else. I did have a good airspeed indicator, vertical speed indicator, pressure altimeter and a good wet compass but I knew that when I penetrated the clouds (without pitot heat) I might lose most of what I did have if it took very long to break out.

Fortunately, I had a flashlight with a long cord and a standard Navy whistle attached. I removed the flashlight and hung the cord with the attached whistle from the center mirror and found I was able to maintain a wings level position by keeping the whistle hanging in a vertical plane, straight down toward the center of the instrument panel. I was well clear of all airways and knew that several Navy target complexes were just to the east and

northeast of my position. I knew the targets to be cold on weekends (and weather precluded any target work anyway) so I pointed my staggering steed northeast and pushed over into the goo with a scan pattern consisting of airspeed, vertical speed indicator, whistle . . . airspeed, vertical speed indicator, whistle . . . .

I finally broke out at about 1800 feet AGL, wings level. I was a little north of where I estimated but still well clear of the airways. I soon recognized a landmark, oriented myself and headed for homeplate VFR. I then made a somewhat hairy landing on the long, off-duty runway.

I don't recommend a change in NATOPS procedures for a situation like this but, even though I have over 3000 hours (with 700 hours in model), I learned a great deal from this hop and would like to pass it on in the hope that someday it may save someone else an aircraft.

First, I recommend that you *always* know where you are. Know where the airways are located, where the restricted or warning areas lie and what is located in these areas. Are they sanctuaries or are they to be avoided at all costs? In short, know where you can descend without getting shot up, having a midair collision or getting a flight violation.

Second, know your local flying area. Florida countryside is flat and this made a safe descent possible in this case but it would have been impractical over most other land areas due to mountains or high terrain. Also, know the landmarks in your local area: lakes, rivers, highways, etc. Many jet types climb out and go via tacan to the general area where work is to be done before starting to look for landmarks. Know the entire area and carry a WAC or sectional chart.

Third, know your aircraft. Although I have 700 hours in model, I learned a great deal about the A-7 that day. My biggest problem was actual physical control of the aircraft. Without yaw stabilization, pitch or roll augmentation, or trim, the aircraft is very difficult to fly and I almost lost it trying to give the tower a wingrock and make a turn downwind (I lost 600 feet in a 10-20 degree break with both hands on the stick). Also, know your hydraulic, fuel, electrical and emergency systems. Know what fuel is available; know what fuel sequencing is automatic and what requires electrical power. Know what emergency systems are electrically actuated, what hydraulic systems require electrical actuation or retraction. Know what pneumatic backup systems can be activated only once and cannot be retracted or recharged. With no indicators for gear, flaps, launch bar, hook, EPP or emergency systems, how can you know your configuration is correct for flight and for landing? I didn't know but I was fortunate to get by once without knowing all these answers. I *will* know and be ready before I have another emergency!

The fourth lesson is one we have all heard many times before but it is worth repeating. Don't let operational commitments dictate unsafe practices or incomplete maintenance. In this case the problem was traced to a faulty EPP that had been received and installed the day before. The squadron had officially moved aboard ship three days prior and only a divert crew was left behind to build this "hangar queen" aircraft as parts arrived. The EPP was installed but was not turned and checked on the deck as required by the MIMs because the blower was aboard ship. The divert crew had worked 15 hours straight putting this bird back together and had assumed that the EPP was in fact ready for issue.

Along these lines I would like to make one final comment. I think it's time controlling custodians and ComFAirs came up with a realistic lead time to fill NORS (Not Operationally Ready Supply) requirements for deploying squadrons. (If this situation had ended in an aircraft accident the cause would have been determined to be almost 100 percent squadron maintenance error for not ground testing the EPP. Actually, the underlying causes go far beyond squadron control.) Until a more realistic lead time is established, squadrons will continue to take shortcuts, dictated by the time remaining, to get the aircraft up by deployment dates. I personally recommend not less than seven days' lead time to fill NORS requirements at which time a "rob" authorization should be approved. In this case the rob authorization came at 1500 on Friday afternoon (two days after the squadron had officially moved aboard ship). This allowed only 42 hours, over a weekend, to build this aircraft, test hop it and pull the required precarrier ops checks. This one almost didn't make it; the next one may not make it at all.

Whistlemouse

Whew! Glad you made it but we can't recommend the whistle as a standard, standby attitude indicator.

Your recommendations are well-stated – and pertinent, especially the one which warns against letting operational commitments lead to unsafe practices and maintenance shortcuts. If correct, by-the-book maintenance (with required ground tests) cannot be completed in the time available, the situation should be brought to the attention of higher authority to decide how the matter is to be resolved. Only in this way can such problems come to the attention of those who have the responsibility for eliminating the basic causes. If maintenance personnel at the working level take it upon themselves to omit important ground tests or take other shortcuts, even in the name of meeting an operational commitment, safety is bound to suffer in the long run.

Remember Tom Swift and his Atomic Spad? Well, sir, in the unceasing efforts of APPROACH to bring you the best of the Tom Swifties (aviation style) herewith for your approval is the latest load to drop out of our incoming box. This choice collection is the handiwork of LCDR Bill Thomas who, as you faithful readers may remember, is a former Managing Editor of APPROACH.

Tom Swift

"I pulled up and let go right over the target," he said, loftily.
"Bomb's safe," he said, disarmingly.
"I can't see out of my windshield," he said, frostily.
TIC TIC TIC TIC TIC

Strikes Back!

"I can't hit the *%$+† target," he said, aimlessly.
"You had that last approach," he said, testily.
"My throttles are retarded," he said, idly.
"I shouldn't have reached into that prop," he said, offhandedly.
"I've lost my cyclic pitch," he said, collectively.
"That wasn't such a hot shot," he said, coldly.
am going faster than you are," he said, machingly.
"Switch to 243.0," he said, guardedly.

A Single-Engine Bird

By LT H. S. Oxenhandler, MC

26

2

HI THERE, Ace! Yes, you, sitting there with APPROACH in your lap, a sandwich in one hand and a cigarette in the other.

Remember the good old days back in preflight? You know, the regular exercise program and the uniform trousers with the 32 inch waist? Think you could squeeze into them now? Is it a struggle every morning to tie your shoes or do you just have your wife do it for you?

Wasn't it easy back in Pensacola to breeze around the obstacle course or the cross-country course? Just how many corpsmen would it take to revive you if you had to do it now? Sure, it's been a few years since then and those Wings of Gold have become a little salty. But that's no excuse. Maybe your conscience is beginning to bother you a little and if it is, that's a good start.

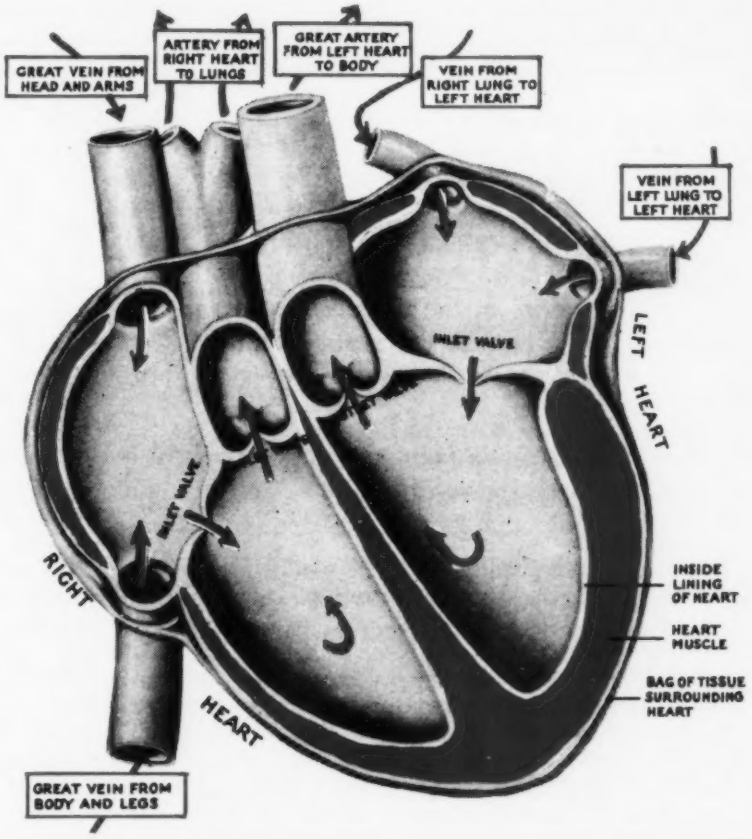
How about getting serious for a few minutes about a very important matter – your life.

Let's face a few facts right now and let's start with this one: *no matter how you look at it, the human body is a single-engine bird.* Think about it in those terms for a minute and you'll get the point. The tiger you look at in the mirror every morning is running on one motor. If you neglect it, it'll quit on you one day when you least expect it. It's just that simple. Here are some basics about your engine (heart) and its fuel system (circulatory plumbing) and some suggestions to help you live longer and more enjoyably. All those interested, read on . . .

Anatomy and Function of Your Heart

The heart is a muscular organ with a tremendous capacity for work. In the average adult it is about the size of a large fist and it pumps approximately 1800 gallons of blood per day under resting conditions. During an average day your heart will beat 100,800 times; during a year about 36,792,000 times and during a lifetime of 60 years about 2,207,520,000 times. The primary function of the heart is to pick up the blood returned to the heart by the veins and pump it out through the arteries. The millions of red blood cells circulated by the heart pick up oxygen in the lungs, deliver it to the cells and then pick up carbon dioxide and other waste products of metabolism for removal. A schematic diagram and accompanying legend is shown in Fig. 1.

I think we are all in agreement, then, that the human heart is a remarkable little engine but just like any other engine it needs fuel to run on. The heart supplies itself


GREAT VEIN FROM HEAD AND ARMS
ARTERY FROM RIGHT HEART TO LUNGS
GREAT ARTERY FROM LEFT HEART TO BODY
VEIN FROM RIGHT LUNG TO LEFT HEART
VEIN FROM LEFT LUNG TO LEFT HEART
INLET VALVE
LEFT HEART
OUTLET VALVE
RIGHT HEART
INSIDE LINING OF HEART
HEART MUSCLE
BAG OF TISSUE SURROUNDING HEART
GREAT VEIN FROM BODY AND LEGS

The heart is a powerful hollow muscle divided, by a wall down the middle, into two main divisions — a right and a left. Each division has two chambers which work together as a unit. The blood stream flows from the body into the right side of the heart through veins. From there it is pumped to the lungs, where it gets rid of a waste gas (carbon dioxide) collected from the body cells and picks up a load of oxygen to carry to the body cells. After passing through the lungs the blood stream flows into the left side of the heart, from which it is pumped to the body through arteries.

The drawing on this page is not an exact representation of the heart in cross-section, but rather a pictorial diagram to show the course taken by the blood from the body → to the heart → to the lungs → back to the heart → and out to the body again.

Fig. 1

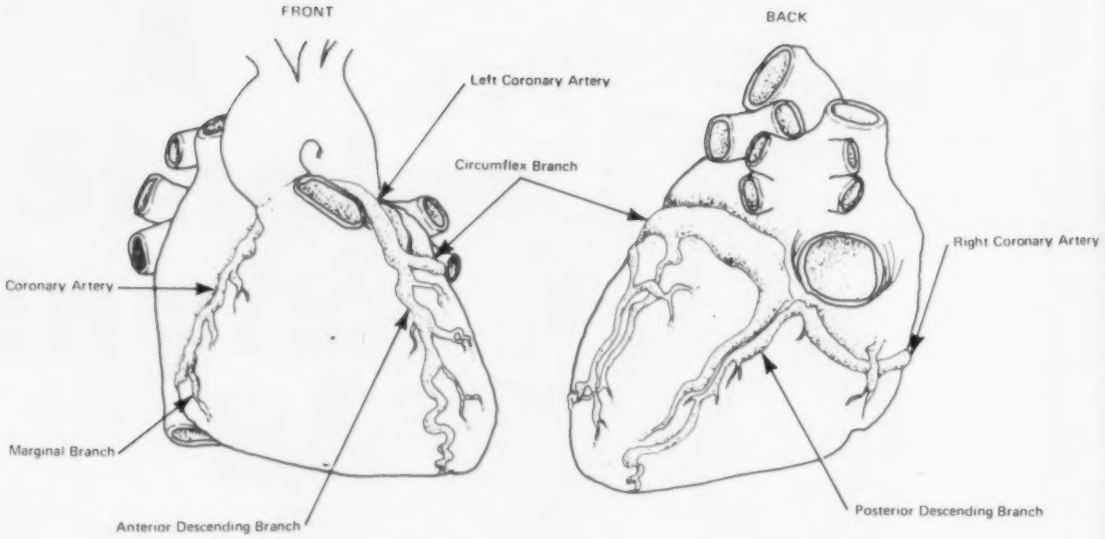


Fig. 2

with oxygen and nutrients mainly through two arteries, the left and right coronary arteries (Fig. 2). As long as these arteries are able to supply the heart with sufficient quantities of these substances, it will continue to work normally. There are situations, however, that develop in which the heart does not receive the necessary amount of blood for proper function.

When you hear that someone has "heart trouble," it is probable that he has CHD (coronary heart disease). CHD is a disability of the heart arising from either a reduction or an arrest of the blood supply to the heart muscle. CHD is most often due to hardening of the arteries of the heart.

Hardening of the coronary arteries occurs when the fatty substances in the blood become incorporated into the cells lining the inside of the arteries. This incorporation of fatty substances results in thickening and hardening of the wall of the artery and, in time, the artery may become completely occluded. When this process completely blocks off a coronary artery, the portion of the heart which is supplied by that coronary artery may die. If that portion of the heart which dies is vital to the function of the heart itself, the heart will cease to beat. This, as you might imagine, is quite an unhealthy situation.

Your first reaction to this might be, "Yeah, that's all well and good but doesn't hardening of the arteries just happen to old people?" *Negative.*

First of all, there is considerable evidence that hardening of the arteries can and frequently does begin in infancy or during childhood. Secondly, few adolescents or young adults ever receive meaningful or effective guidance from the medical profession concerning measures they might take to slow down the process of hardening of the arteries. Disease of the heart and circulation system is the leading cause of death in the United States. More than 50 percent of these deaths are due to CHD. *Hardening of the arteries is the rule rather than the exception.* Studies performed on American males who died accidentally (with a mean age in the early 20s) showed that more than 75 percent had hardening of the arteries to some extent. In 15 percent of the cases the coronary arteries were at least half-occluded.

How does that grab you? Now, let's take a look at some of the risk factors involved and see what we can do to help ourselves.

Tobacco

Knowledge of the association between long-term inhalation of tobacco smoke and lung disease is widespread and established. Not quite so widely accepted, however, is the strong statistical evidence

which links heavy cigarette smoking with early hardening of the arteries and its follower, CHD. Pooled observations of two large, well-conducted studies done in Albany, N. Y. and Framingham, Mass. clearly showed that the more cigarettes smoked, the greater the hazard of heart attack and/or sudden death therefrom. In fact, risk of CHD may be as much as 300 percent greater in very heavy cigarette smokers as compared to non-smokers, cigar or pipe smokers (who do not inhale) or ex-cigarette smokers (see Fig. 3). Other medical researchers have confirmed these observations. Of great significance, however, is that the risk of CHD in cigarette smokers seems to drop toward that of non-smokers whenever cigarette smoking is stopped.

Medical science does not know exactly why cigarette smoking is associated with an increased incidence of CHD. Several explanations have been offered. One of them is that the products inhaled increase the tendency of blood to clot but no explanation has, as yet, been convincingly provided. Despite our ignorance of the manner in which cigarette smoking produces its harmful effects, the evidence is consistent that cigarette smoking is, indeed, a serious health threat and that quitting is accompanied by decreased illness and death from CHD.

OK, that's the straight talk. Now you know just about as much about the effects of cigarette smoking on your heart and circulation as does the average physician. So, why do people still smoke? The most probable reason for this is that everyone *denies the fact that it could happen to them.* "Not me!" "Not old J. Rodney Stud!" "Not Ricky Ramjet." "Maybe the other guy will get it, but definitely not Number One!"

What factors contribute to this denial of reality? Well, here are just a few:

1. To a smoker, cigarettes taste good.
2. Cigarette smoking is tremendously popular.
3. It is accepted at all levels of our society and culture.
4. *Breaking the habit* is difficult.

You can lead someone to the facts but you can't make him think. Here's a chance to start thinking and stop smoking!

Diet

The employment of dietary measures in the prevention of CHD is rapidly increasing. The average person nowadays hears a great deal about cholesterol and heart disease but is not informed as to the relationship between the two, the significance of elevated fatty substances in the blood and, finally, what to do about it. Furthermore, if a general statement can be made about the role of diet in the prevention of heart disease, it is probably that both the doctor and patient have had relatively little enthusiasm for, or confidence in, these measures. The patient is quick to sense any lack of conviction in a physician's dietary advice and he subsequently becomes discouraged.

There is, indeed, an important relationship between elevated fatty substances in the blood and CHD. Earlier studies by medical researchers have indicated that populations consuming diets which are low in fat,

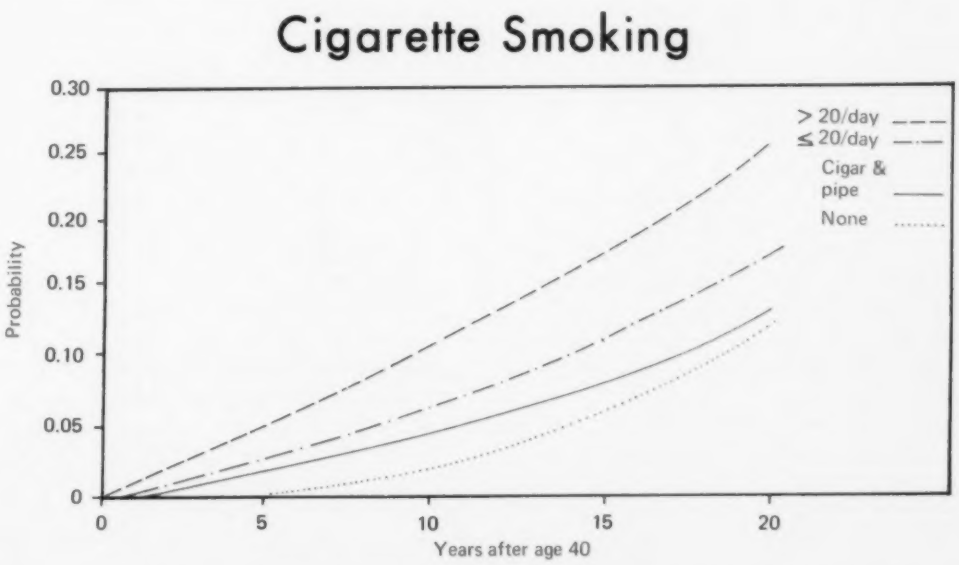


Fig. 3: Cumulative net probability of development of coronary heart disease in men after age 40.

especially animal fat, have lower levels of cholesterol in the blood and lower death rates from CHD. Conversely, populations consuming diets rich in animal fat, such as in England and the United States, have higher levels of cholesterol in the blood and higher death rates from CHD. Blood levels of cholesterol are definitely lowered when unsaturated fats are substituted for saturated fats. Since cholesterol is present in animal but not in vegetable foods, vegetable fats are recommended over animal fats for cooking purposes. So despite the widely held view to the contrary in recent years, the amount of cholesterol consumed in the diet *does* influence the amount of cholesterol in the blood. Furthermore, a large study recently conducted revealed that an elevated blood level of cholesterol increases the likelihood of CHD from two to seven times that of people with normal levels.

While we're on the subject of fatty substances in the blood, I should mention another one for the sake of completeness. "Triglycerides" is a fancy name for another type of fat molecule which, when elevated in the blood, has been associated with an increased incidence of CHD. Some authorities feel that by limiting one's intake of sugar and foods containing large amounts of refined sugar, e.g. candy, that elevated blood levels of triglycerides can be reduced substantially. This may, indeed, be true.

OK, all this is fine, but let's get specific. Here are some dietary rules for consideration:

1. The following protein sources are listed in order of increasing animal fat content and should be eaten proportionately:
   a. fish and shellfish
   b. poultry
   c. veal
   d. beef
   e. mutton
   f. pork
2. Remove all visible fat from meat before eating.
3. Use skim milk instead of whole milk or cream.
4. Don't use excessive amounts of butter, lard, shortening, olive oil or peanut oil. Vegetable oils rich in linoleic acid should be used instead, e.g. corn oil and safflower oil.
5. Hard cheeses, e.g. cheddar and Swiss, should be replaced to a great extent by low fat cheese, e.g. cottage cheese.
6. Limit egg consumption to a minimum, preferably one or two weekly for adults.
7. Do not use sugar abundantly or eat a lot of candy. Vegetables, fruit and fruit juices are recommended, instead, because they contain natural sugars.

Weight Reduction and Exercise

There are, admittedly, several causes of overweight but by far the most common is overeating. Medically, obesity is defined as having fat tissue in the body in excess of that amount consistent with good health. More specifically, one's ideal weight is that which is associated with the lowest mortality, according to insurance company data obtained from large numbers of policy holders. Ideal weight approximates that at age 25 and emphasizes the fact that weight gain during adult life is associated with increased mortality. A study comparing actual weights for various ages with ideal weights showed that the average American is 20 pounds over his ideal weight by the time he reaches his forties and fifties. Among Americans, the prevalence of CHD is lowest in persons below normal weight and increases proportionately with degree of overweight. In the large study mentioned above, overweight was one of the factors that increased the likelihood of CHD especially when associated with high blood pressure and smoking. In addition, your heart has to perform extra work to supply the excess fat with oxygen and nutrients.

There are three main approaches to the treatment of obesity: drugs, diet and exercise. Drugs which suppress the appetite are usually amphetamine derivatives. They are effective for only a few weeks and the dependence on their stimulatory effects which may develop could make withdrawal a problem. The author does not recommend their use, especially in aviation personnel. Such drugs have no demonstrated role in the long-term management of obesity.

Diet is the mainstay treatment of overweight. Reduction of excess weight in obese persons is associated with a general feeling of well-being as well as improved health. Although lifelong vigilance is required to maintain reduced weight once it is achieved, the benefits justify the utmost effort on the part of the doctor and patient. Diets of all kinds exist: starvation, high protein, low carbohydrate, liquids, etc. How does one know which to choose? Well, the author has reviewed several of the existing diets and can recommend one in particular: the Weight Watchers' Diet, which is quite excellent. It is a well-balanced, low cholesterol, palatable diet which offers plenty to eat. Most importantly, however, is the fact that it works. There are Weight Watchers' Clubs all over the country. This diet has worked wonders for many people and will work for anyone who sticks to it.

Exercise is an important part of the treatment of obesity and, in addition, offers a means of improving the condition of the heart and circulation. The American Heart Association has incriminated physical inactivity as a factor predisposing to CHD. It recommends that most

adults increase their levels of physical activity as a prophylactic measure. Several other extensive studies cite a lower death rate from CHD in people with a higher physical activity level. Two possible mechanisms of the influence of physical activity are: 1) increase in blood supply to the heart and 2) improved efficiency of the heart and lungs. Furthermore, exercise burns up those extra calories.

Not everyone should participate in an exercise program. If you are considering one, be sure to consult your physician for a physical examination first. Tell him of your intentions and ask him if he has any restrictions to place on the amount of physical activity you can perform. Follow his advice. If he gives you a "thumbs up," the author can heartily recommend *Aerobics*, an excellent guide to physical fitness written by MAJOR Kenneth H. Cooper, MC, USAF. His program of gradually increasing exercise is, in my opinion, sensible, thorough, effective and offers a variety of activities to attract and hold the interest of most people. It encompasses running, swimming, cycling, walking, stationary running, handball, squash and basketball. *Aerobics* is fast gaining wide acceptance as an exercise program.

The last several pages have been a brief outline of your heart and circulation, how it works and how to improve it so that it will serve you better. Tobacco, diet, weight reduction and exercise have been discussed from the point of view of how they affect your heart and circulation, generally and specifically. An attempt has been made to put down on paper some general and specific guidelines to help you along the road to a longer, healthier life. Good luck!

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Nurture your mind with great thoughts. To believe in the heroic makes heroes.

Benjamin Disraeli

Heat-Stroke

TWO THINGS are important to remember about heatstroke:

- Heatstroke or sunstroke is a medical emergency with a potentially high mortality rate.
- Cessation of sweating is a sign of heatstroke and corrective measures should be initiated *immediately* while the condition is still reversible.

Sometimes a person getting heatstroke feels it coming on. Warning symptoms are headache, dizziness, mental confusion, weakness, nausea, excessive urination and, as we said above, diminished or absent sweating. Usually, however, heatstroke occurs suddenly with collapse and loss of consciousness. The victim may go into a deep coma and he may convulse. His skin will usually be hot, red and dry, his pulse will be full and rapid, his breathing will be rapid and deep and his temperature will climb to 106^0 or more.

The most important thing to do is lower the heatstroke victim's body temperature *as rapidly as possible.* In the field his clothes should be removed and if there is any source of cool water nearby, he should be immersed in it. If not, sprinkle water over him and fan him to speed its evaporation and thus increase its cooling effect. In addition, TB Med 175 (the Tri-Service instruction on heat illness) states that "attendants should rub the patient's extremities and trunk briskly to increase circulation to the skin."

Anyone with heatstroke should be taken to the hospital or sickbay immediately. Measures to cool the body during transit should be continued if possible. For instance, if an ambulance is being used, leave the rear door open so air currents passing through will help cool the victim.

If you have ever had an attack of heatstroke, be careful to avoid a second exposure to the conditions which precipitated it. One school of thought on this is that one attack of heatstroke leads to another. A second view is that a person who has had heatstroke is susceptible to it in the first place and he remains susceptible to it.

Resistance to heat illness is increased by:

- Gradual acclimatization to hot environments (or at least graduated introduction of the required work level in a hot environment).
- Replenishing water and salt losses from the body as they occur.
- Maintenance of optimum physical condition.

Supervisory personnel who need more information on the process of gradual acclimatization to hot environments should look up TB Med 175 (NavMed P-5052-5), The Etiology, Prevention, Diagnosis and Treatment of Adverse Effects of Heat, 25 April 1969.

No Injury

THE plane captain of an SP-2H which made an intentional wheels-up landing struck his head hard on an overhead panel during his egress. He received no injury because he had his hardhat on. Afterwards, he said he definitely felt that his hardhat prevented possible serious injury or unconsciousness when he hit his head.

notes from your flight surgeon

Frank Self-Appraisal

"FOR several seconds after the helicopter stopped its violent post-impact vibrations, the pilot and I just sat there in shocked disbelief. This was the worst thing we could have done because all of the electrical power was on and fuel was dripping out of both ruptured fuel cells. We actually continued to sit there discussing what happened! Finally we departed the aircraft through the cabin, which again was wrong. We should have exited through the emergency doors immediately after the engine stopped."

CH-46 Copilot

To All Pilots and NFOs

THOROUGH knowledge of ejection procedures and careful preflights of ejection seats are imperative.

Who should know better than you that your life can depend on these procedures.

One checkpoint which can be overlooked – through haste, complacency, interruption of habit pattern or some other reason – is the ditching handle. Make sure it has not been actuated and make sure that it is fully seated.

- If the ditching handle has been actuated before ejection, you will go out of the aircraft completely unrestrained. (The Naval Safety Center has just such a fatality on record. A rear seat occupant ejected completely unrestrained because the ditching handle had been activated prior to ejection. He sustained fatal head injuries during egress when he pivoted forward and struck the instrument panel.)
- If after ejection you separate from the seat manually by pulling the ditching handle for any reason, you *must* manually actuate your parachute in order for it to deploy.

Each particular aircraft's NATOPS Manual and NATOPS Pocket Checklist gives specific information on ejection procedures and ejection seat preflight.

Be sure you know your procedures and during preflight be sure you check each item *every single time*.

Take no chances.

A wrong move or an omission can cost a life – *your* life.

Vaporized

WHEN a bird was sucked into the starboard engine of an F-4B after touchdown, the *Phantom* veered sharply right, blew a tire, zigged back to runway heading and finally zagged off the runway altogether. The pilot initiated the automatic sequence ejection system as the aircraft approached the edge of the runway. Both canopies left the aircraft and the pilot was ejected; however, the RIO's seat malfunctioned and did not fire. He rode the aircraft to a halt, secured both engines and disembarked.

The pilot landed safely with no injury. The RIO sustained burns on his right shoulder and arm from front seat rocket exhaust. His nomex flight suit prevented deep second and third degree burns of his right arm, the investigating flight surgeon states, in spite of the fact that a good portion of the right sleeve of the suit was *vaporized* by intense heat.

Expect the Unexpected

BECAUSE the helo was scheduled for a predawn perimeter flight to watch for mortar flashes around an in-country field, the copilot chose not to wear his web belt with survival radio, sheath knife, pistol, strobe light and pencil flares attached. (The rest of the crew had on all their survival equipment.) But although only a short distance outside the base perimeter, pilots and crew soon found themselves in a survival situation.

The flight was routine until 0500 when fog began to move over the hills. After a missed GCA approach the pilot attempted to make a visual landing when he saw the field momentarily. He lost contact, however, and requested another GCA approach. During descent on final the pilot became momentarily disoriented but recovered and landed the aircraft. Just prior to touchdown he realized that he was landing outside the base perimeter. Taking off again, he tried to air taxi but settled toward the trees and finally touched down in a rice paddy. The crew exited the aircraft uninjured and set up a defensive perimeter around it. Attempts to contact base tower with the pilot's survival radio were unsuccessful although the radio was working. At daybreak an Army patrol located the crew.

"Required personal and survival equipment should be carried on all flights," the investigating flight surgeon stated. "This mishap demonstrates that even though an aircraft is within autorotating distance of an airfield, a survival situation can develop. Expect the unexpected!" ◄

SEE and be Seen!

By Laurel D. Sand
Life Support Sciences Department
USABAAR

Aviation personnel who are injured or killed in ground accidents are just as lost to combat resources as those injured or killed in aircraft accidents.

MANY ARTICLES have been written and many bull sessions have been held by pilots about *aviation* safety. The smart ones learn by their mistakes and the mistakes of others and become safer, more professional pilots. This concept applies not only to those who fly, but to all who *drive ground vehicles*. With the training pilots receive, they should be well aware of most safety rules, many of which are only common sense. Most pilots don't just fly – they also drive automobiles, motorcycles, trucks, etc. The ones who are injured or killed in ground accidents are just as lost to combat resources as those injured or killed in aircraft accidents.

As a helicopter instructor pilot, I emphasized to my students that as soon as the sun disappeared behind the horizon, our lights went on and we were logging "night time." The lights were on for an obvious reason – TO BE SEEN! I wanted the whole world to see me. This is precisely the point I am making.

Uncle Sam has quite an investment in you by the time you have several years of flying under your belt. No doubt you are safety conscious while flying and take every precaution, even to the point of defensive flying. You wouldn't consider flying after sunset without turning on your navigation lights. Yet, there seems to be a great reluctance to turn on automobile headlights when the sun goes down. The reason probably will never be known without the aid of a couch.

A rated pilot nearly caused what could have been my last roundrobin to the grocery store. No, I didn't fly – I drove. The first leg was uneventful, but on the trip home I was nearly clobbered. The sun had gone down, but it wasn't quite dark. Night flying was in progress at the nearby base and, by the number of airborne lights I saw, a lot of folks must have been behind schedule.

I was approaching a major intersection at about eight knots with three cartons of milk on the seat beside me. The "YIELD" sign told me to slow down, look and turn with caution. I *did* look – both ways. I had just started my turn when I heard the squeal of tires and a horn that sounded as if it was in my right ear. I saw the blurred

outline of a dark, fast moving car flash by me without lights. I slammed on my brakes and the milk cartons were catapulted to the floor.

First, I was terrified. Then I blew my cool. I made a 180 to catch the so-and-so to give him a piece of my mind. It took several minutes to follow him home, and this gave me time to cool off considerably. We both pulled up to the curb, stopped and got out of our cars. I lucked out by cooling off because he was big. His flight suit made him look even bigger. I told him that I was the guy at the intersection that he almost hit, even though I looked carefully before pulling out.

His answer was, "No sweat, I saw your headlights in time to miss you."

I explained that I did not see him because, without headlights, he blended into the background. He said, "I could still see. No use wasting the headlights, since it wasn't dark. But I guess I could have turned on my parking lights."

Some compromise! He wasn't parked when he almost hit me. Suddenly, he saw the light (no pun intended). He said, "We almost had a wreck that would have been my fault. You didn't see me, but I saw your headlights in time to miss you." He offered his hand and said, "I'm sorry."

Maybe the apology was all the satisfaction I needed, especially from such a big fellow. I wasn't angry anymore – just puzzled. On the way home, I saw several other cars driving without lights, though it was nearly dark. Why? It's important to see, but it's probably more important to be seen. This is a *must* in defensive driving.

In 30 years of driving, some of it professional, I've tried to learn as much about driving as I have about flying and, by analyzing my mistakes, become a better driver. I have found that headlights seldom wear out from use. It is entirely possible to have the original headlight unit in a 10-year-old car. The major electrical system is working continuously as long as the engine is running. The cost of using your headlights 24 hours a day for 10 years is insignificant.

Waste electricity? Cost more to drive when you use your lights? Absolutely not. The use of such a simple safety device as your headlights is far better than an accident, hospital bills, a possible lawsuit or worse.

Here are a few points to remember:

1. Turn your headlights on during *all* periods of reduced visibility. Dusk and dawn are two of the most dangerous times of the day to drive.

2. *Do not* use your parking lights while driving. In some states this is illegal. At a distance your approaching car may be mistaken for a parked car. If someone coming the other way should attempt to pass, it could result in a collision. Your headlights are much larger in area and brighter. They can be seen from a much greater distance and will indicate that your car is moving. Parking lights are of little use in rain, fog, dust or darkness.

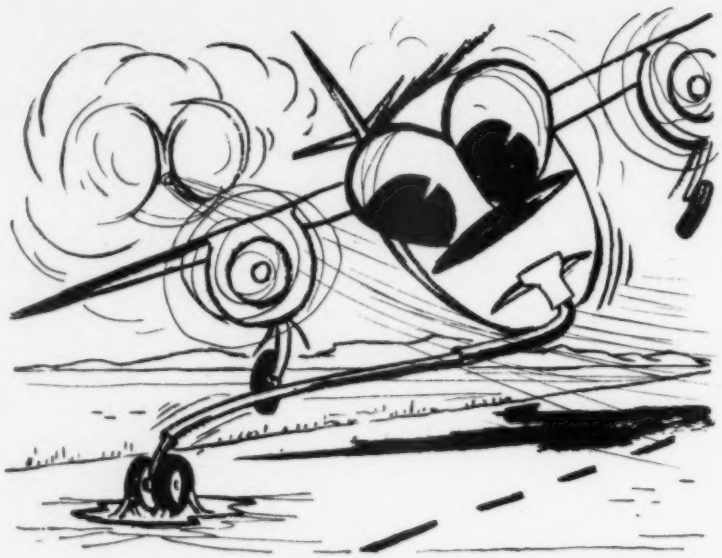
3. You owe it to your fellow man, your family and yourself to use *all* the safety devices at your disposal.

The Port of New York Authority reduced certain type traffic accidents by almost 20 percent simply by using the headlights on their vehicles for all operations. The greatest improvement was in the reduction of *rear end collisions to passenger vehicles, which showed a 45-percent improvement*. It was also found that those accidents which did occur to the vehicles with their headlights on were a good deal less severe than similar accidents to unlighted vehicles.

The next time you take an extended trip or a Sunday drive on any busy highway, make it a point to watch for buses and trucks. If you haven't noticed before, you'll be surprised how many of the real pros in the driving business use their headlights all the time, regardless of visibility or weather.

You may see me driving with my headlights on any time I think visibility is reduced and you may think I'm nuts because you can see fine. If you don't have yours on, I wish you luck. You see, I'm one of several million drivers who can't see quite as well as we used to. ◄

U.S. Army Aviation Digest, April 1970



By the Grace of. . .

I MAY not qualify for the top award as the dumbest pilot still alive but the only one above me on the totem pole sure is being crowded. I taxied out to the duty runway (east) in an S-2 for a routine training flight. The wind was south/25 knots with gusts to 35. The north/south runway was closed because of construction (or I would not have a story to tell). After runup I received clearance for takeoff and carefully positioned the plane on the right side of the runway knowing I was going to have lots of left drift (nearly 90 degrees of crosswind). Initial takeoff roll was normal and I held the runway heading easily. However, my takeoff began to turn into the proverbial bucket of worms when I started to lift the nosewheel off the deck at 90 knots. The plane rapidly began drifting left and I couldn't break the nosewheel from the concrete. I thought about jammed controls but they weren't really jammed – just resisting way more pressure than I had ever exerted on rotation before. With thoughts of a crash before me, sweat pouring out of me and adrenalin full ON, I literally jerked the plane into the air at 120 knots as it departed the left side of the runway. Takeoff should not have been attempted under the above conditions. Never again!

Chastened Mouse

I'll buy that. – Ed.

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT,

PREVENT AN ACCIDENT

Fuel Contamination

JUST a note to folks in SEAsia and other tropical places to remind them to check their JP-4 during preflight. We're glad we do. These checks have saved the lives of two A-3 crews in the last month on flights originating at this base in Vietnam.

Gas Mouse

P.S. 20 gallons of water could ruin your whole day.

You couldn't be more right. Observing procedures to check for water will pay off anywhere. It's worth noting that cold weather also brings problems because it degrades the capacity of fuel to mix with water thus causing greater separation and increased risk of a fuel system freeze-up or a slug of water in a combustion chamber designed for JP or avgas only.

Near Mid-air

"I WAS the pilot of a CH-53D shooting practice GCAs one morning at MCAS (H) New River. While under positive control and cruising at 2000 feet, an A-6 (Marine) passed about 50 feet in front of me in an estimated 30-degree nose-up attitude and in a near vertical bank. GCA did not hold him until after he popped up and the near miss had occurred. This leads me to believe he was very, very low while flying through a high density helicopter area. Prevention: Keep high speed aircraft away from helicopter traffic patterns."

CAPT USMC

There are two types of clowns that no one loves. One is the golfer who doesn't rake a sandtrap after an excavating job and the other is the type you refer to who cavorts through airport control zones in search of prey. Even though he

came at you from the blind side it is hoped that when you saw him you recognized some kind of markings and reported him to the world – including New River and Cherry Point. Our information on Sandblower routes does not indicate any of these anywhere near your base. Wonder what his excuse was?

Curiosity Killed the Cat

AT a west coast military airfield, a transient pilot requested replacement of the ARN-14 VOR unit in his KA-3B aircraft. While this task was being performed, personnel apparently unfamiliar with systems in the KA-3B actuated the escape chute door system. This door, which is part of the normal entry and exit tunnel of the aircraft, was open at the time of activation. Had the door been closed and the system activated, the door would have been lowered by the explosive device in the system and anyone standing under or near the door could have been seriously injured.

This occurrence should reemphasize the fact to personnel concerned that when working in unfamiliar areas do not activate or pull any handles, knobs or switches when any doubt exists as to the system that those handles, knobs or switches are associated with.

Angry Mouse

Personnel assigned tasks on transient lines have to be knowledgeable and versatile in order to properly and safely service the many and varied aircraft they come in contact with. Despite the level of technical qualifications each of these men have, each person must temper his curiosity with common sense – "IF YOU DON'T KNOW – LEAVE IT ALONE."

Quality Assurance

AN AIRCRAFT was due for a special 63-day inspection. The airframes work center was instructed by maintenance control to perform the special inspection, utilizing the night crew. The night crew did not complete the inspection and a day crewman (the next day) picked up at the point to which the inspection had progressed. At about 1100 the maintenance officer directed the airframes work center to cease working on the aircraft so that it could have a daily inspection performed and be flown at 1200. The maintenance officer said the remainder of the special 63-day inspection could be finished after completion of the flight.

With this aircraft in a supposedly "up" status and a flight schedule published for the following day, the night shift maintenance control chief should have ensured the special 63-day inspection was completed by the night crew. The day crewman was not allowed to complete the inspection; safety and scheduled maintenance were forsaken and a "down" aircraft was launched, just to meet the flight schedule. NavAirInst 4700.2 says that these special inspections will normally be conducted in conjunction with the daily inspection of the day they become due. It does not authorize a special inspection to be performed early or late as in the case of a calendar inspection when an operational commitment necessitates it.

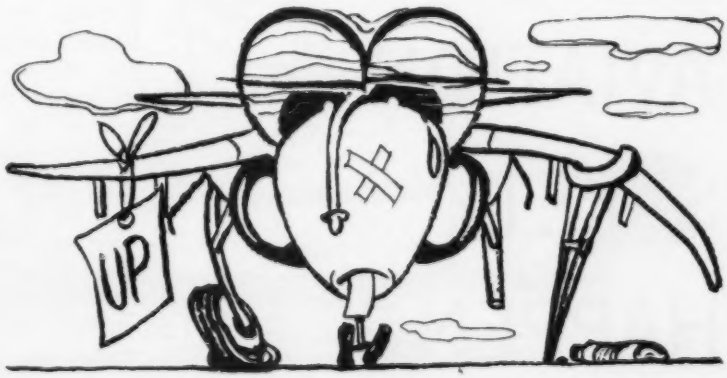
How often do personnel in supervisory capacities read these instructions and then do as they wish and hope their plans don't backfire?

The first few days of FY-70 were set aside for us to review our procedures and try to make the fiscal year more nearly accident free. Now, a few months later, a lot of this has evidently gone with the wind, or so it seems from the foregoing.

With the drastic cutback in manpower and funds, one would think that those of us remaining could and would be a lot more aware of the correct procedures and how to go about accomplishing them.

QA Mouse

This is an interesting account of how easy it is for an activity to deviate from sound practices once the pressure is off. The pressure, in this case, being the "standdown" at the beginning of FY-70. Perhaps other activities could profit by taking a second look at their own quality assurance procedures to insure they are in effect year round and not temporary motivation resulting from a special "standdown."



M.A.S.H.

M.A.S.H., what's that? The name of a current movie? Right, but what safety message lies within the confines of those four letters? How about MAKE AVIATION SAFETY HAPPEN?

Who, within the naval aviation community, has the final responsibility to MAKE AVIATION SAFETY HAPPEN? Is it the Chief of Naval Operations, Commanders of SysComs, Naval Safety Center, Major Commands, C.O.s, OICs, ASOs or NATOPS instructors? Of course not. They do provide the best available aircraft, support equipment, safety education material and personnel to effect a successful safety program but in the final analysis it's the guys flying the aircraft or working on them who have the ultimate responsibility to MAKE AVIATION SAFETY HAPPEN.

Some classic examples of those who did M.A.S.H. and those who did not are contained in the following briefs.

MAKE
AVIATION
SAFETY
HAPPEN

- A helo pilot, with no IFR experience in the past three months, took off on a night mercy mission from an airfield in Vietnam. The weather was marginal at best. The flight was to be conducted over water but adjacent to some rather hilly terrain. After continually flying in and out of the soup, the pilot evidently became disoriented, flew over land and ended up flying into a hill. By not realizing his IFR deficiencies and not requesting that a more proficient pilot be assigned the flight, this pilot did not M.A.S.H.

- An S-2 accident was triggered by a maintenance error – failure to install cotter pins after landing gear door actuating cylinder replacement. Subsequent investigation by quality assurance personnel and preflight inspections by line crews and pilots failed to disclose the fact that the cotter pins were missing.

Nineteen hours later, a nut backed off, a bolt fell out and the end result was a Charlie damage wheels-up landing. How can that many personnel inspect the same aircraft and not discover those cotter pins missing? It's easy when they don't M.A.S.H.

• A jet pilot recently returned from Vietnam where he flew over 200 combat missions. On his flight from the West Coast to home base on the East Coast he decided to fly over the Midwest home of his parents. He made two screaming low passes over his house. This must have been sheer delight to his parents watching from the ground. On his third pass he hit a tree and crashed. Imagine the nightmare this must have become for his loved ones. No one will ever know why this pilot forgot to M.A.S.H.

• A two-man crew commenced jacking an A-4C's port main mount to change the tire. Two chain tie-downs on the port wing were overlooked – with disastrous results. Continued jacking caused the port wing spar to crack between stations 114-120. These men had been working without relief for 14 hours. However as the C.O. stated in his endorsement: "The tire crew had changed several tires on the flight deck during this time period with no apparent problem. When they began work on the subject aircraft, the working environment had changed (they were then on the hangar deck) and their routine was altered. Most probably this change of environment precipitated their error." Anytime the working environment is changed, personnel must examine their new surroundings in order to ensure that they can safely carry on their assigned tasks. This tire crew failed to M.A.S.H.

• When the pilot of an S-2D raised the gear handle he discovered that the main mounts wouldn't budge. He returned the handle to the down position but the warning light in the handle stayed ON and the nose gear indication went to barberpole. A glance in the nacelle mirror confirmed that the nosewheel was trailing.

The hydraulic pressure read zero on both sides but there was no evidence of a leak. The hydraulic reservoir was found to be empty and two quarts of fluid were added to the emergency reservior. The copilot continued to pump away but the nose gear remained at trail.

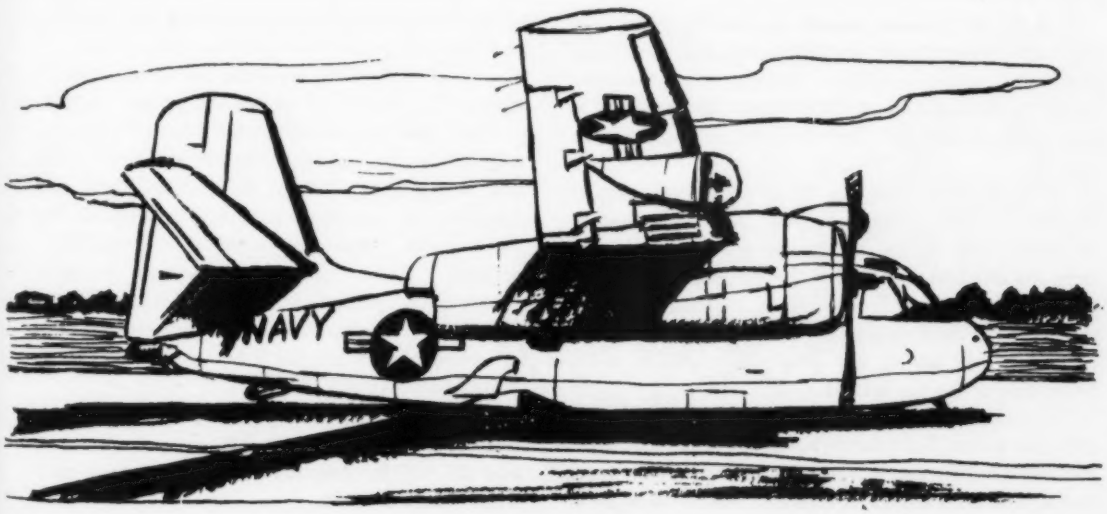
Radio contact was established with the squadron safety officer at the field. After several suggested solutions failed, the pilots were instructed to cut an access hole through the cockpit decking and then try to pry the mount into position.

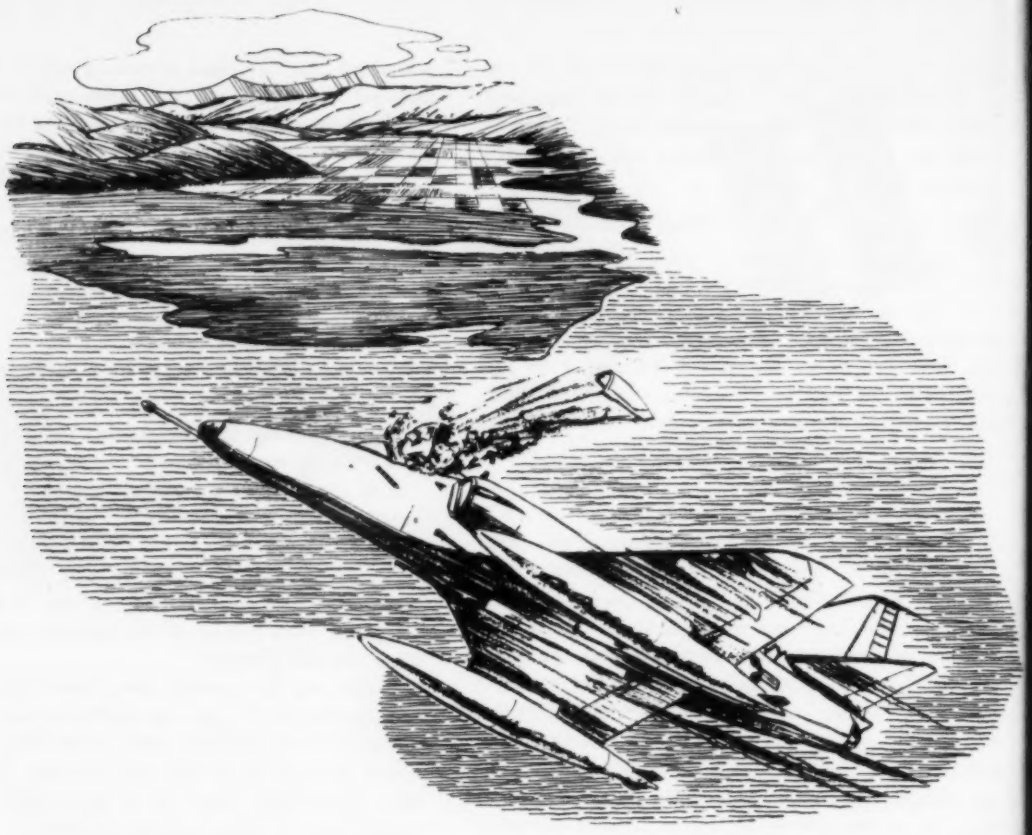
After hacking a five-inch hole through the deck and finding that the emergency pump handle was too short to be effective, they tried extending the pump handle by using an armrest from one of the seats. This also proved to be too short. So, using lanyards from their mae west equipment, they lashed on two armrests, one on either side of the pump handle.

Positioning the extended pump handle just above the shimmy damper, the pilots pushed down and swung the nosewheel back and forth. After a few lusty shoves the mount was locked all the way forward. The warning light in the handle then went out and a SAFE indication popped up on the wheels position indicator.

Pilots in another aircraft visually inspected the landing gear and reported that all three gear appeared to be DOWN and LOCKED. The pilot made a no-flap landing on a foamed runway and held the nosewheel off the deck as long as possible. The nosewheel held when it finally touched down.

Continued





Failure of the drag brace on the starboard main mount turned out to be the culprit. The problem was compounded throughout by the onset of darkness and a threatening rain cloud which hung over one end of the field. The pilots were commended for their ingenuity and professional handling of the situation. These two pilots knew how to M.A.S.H.

• A jet pilot whose aircraft was hit by enemy fire was forced to eject over the Gulf of Tonkin, three miles from the Vietnam coastline. Although his subsequent rescue by helicopter was not without complications, it was highly successful. Here is how he sums up the episode.

"Looking back I can see the advantage of years of training and experience throughout the entire sequence of events. I did not have to think about what to do, it all came naturally to me. Even before I realized what I had done, I had secured my engine, ejected and was descending in my parachute. I dropped my raft, inflated it, inflated my Mk-3C and prepared for water entry. Everything worked as briefed.

"My rescue came off like clockwork. The helo pilots and crew knew their jobs very well and performed them in such an outstanding manner that my time in the water was held to a minimum. A crewman was in the water at my side almost immediately. He helped cut away the lowering webbing (used in case of a tree landing), some of which had tangled around my feet. He then signaled the helo and within seconds it was hovering above us. He hooked up my D-ring and then his and we were hoisted up to the helo together. I have nothing but praise for the entire helicopter crew in effecting my rescue within sight of enemy territory. They are a professional group, doing a professional job and today was no exception."

A pilot was safely returned to his squadron to fly another day because all involved knew how to M.A.S.H.

The briefs cited above are but a few of the goods and bads of aviation safety. Complacency, overconfidence, lack of proper training, inexperience and lack of discipline all contribute to unsafe procedures. On the other hand, rigid conformance to NATOPS and pertinent directives, strict adherence to accepted maintenance procedures, a high level of training proficiency, command attention and keeping mentally and physically fit are but a few of the ways to MAKE AVIATION SAFETY HAPPEN.

In the final analysis, if you *really* want to avoid a crash or a smash, then M.A.S.H. every single day. Those who do will be prepared for an emergency should it strike. Think about it. ◄

A Page from the ASO's Songbook

Oh, The Moonlight's Bright Tonight Up On The Flight Deck

(to the tune of "Oh, The Moonlight's Fair Tonight Along the Wabash")

Oh, the moonlight's bright tonight
up on the flight deck,
And the teletype has said the
launch will go –
You can see the old three-stripers
get excited,
'Cause the great Commanders' moon is
all aglow.

Up the escalator they all go, a laughin'
There's no clag around. The sky's clear near
and far.
And they know when they come home to
U.S. BIRDFARM,
They can fly their bolter patterns VFR.

When the launch is over, spares are
taxied forward.
Not one youngster will be flying
out tonight.
All the junior officers can watch the movie
When the old Commanders' moon is shining
bright.

At a glance it seems that this is
not quite proper
But a second look will show that
it makes sense.
If you've never flown in black air
'round a birdfarm,
When it finally happens, you'll get
pretty tense!

Moonlight's great for makin' Whoopie
by the pool side
And for when the grunion run
away out west.
But it's not for use when you are
taking catshots,
Or when pitching decks make landings
quite a test.

You will notice that the gents who are
Commanders
Didn't get there just
because they're bald or grey –
They all know the old Commanders'
moon is tricky
And for many years they've treated
it that way.

So forget the moon and stay right
on the gages,
Gyro, VSI and other stuff peruse –
And when you get old enough to fly
in moonlight,
You'll know just how much of
it to safely use.

'T'aint a Murphy,

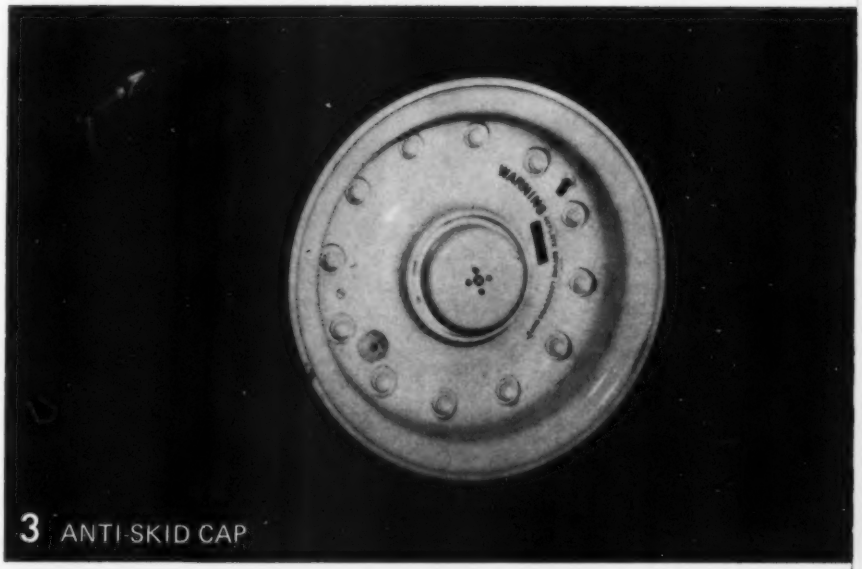
but it's Close'

MURPHY'S LAW is stated thusly, "If an aircraft part can be installed incorrectly, someone will install it that way." A true Murphy is attributed to a design deficiency coupled with a maintenance error, but in this case two items have been designed to be used in the same location yet one serves an additional function.

A-6, C-2A and E-2A aircraft all use the same main landing gear wheel assemblies; however, the cap assembly (PN 9532274) for the A-6 is different from the cap assembly (PN 9524462) used on the C-2A and E-2A (see photos 1 and 2). The A-6 incorporates an anti-skid detection and braking system and the cap assembly is an integral component of this system. The proper cap has a device riveted to its interior which drives the inducement element of the anti-skid detector assembly. The C-2A and E-2A do not have anti-skid braking systems; therefore, the cap assembly is plain and functions only as a hub cap.

Recently, an A-6 squadron experienced a number of repeat discrepancies on the anti-skid system in one of its A-6 aircraft. All efforts to correct the discrepancies were to no avail until someone noticed that the cap assembly was different from the cap assemblies on the other squadron aircraft. Investigation disclosed that the cap assembly being used was the wrong type – it did not have the anti-skid device riveted to the interior. The correct one was installed and anti-skid functioned normally.

A-6 pilots and maintenance personnel performing preflight and other inspections should always check cap assemblies for the four rivet heads in the center of the cap (see photo 3) which indicate the presence of the anti-skid drive device necessary for proper operation of the system.



3 ANTI-SKID CAP

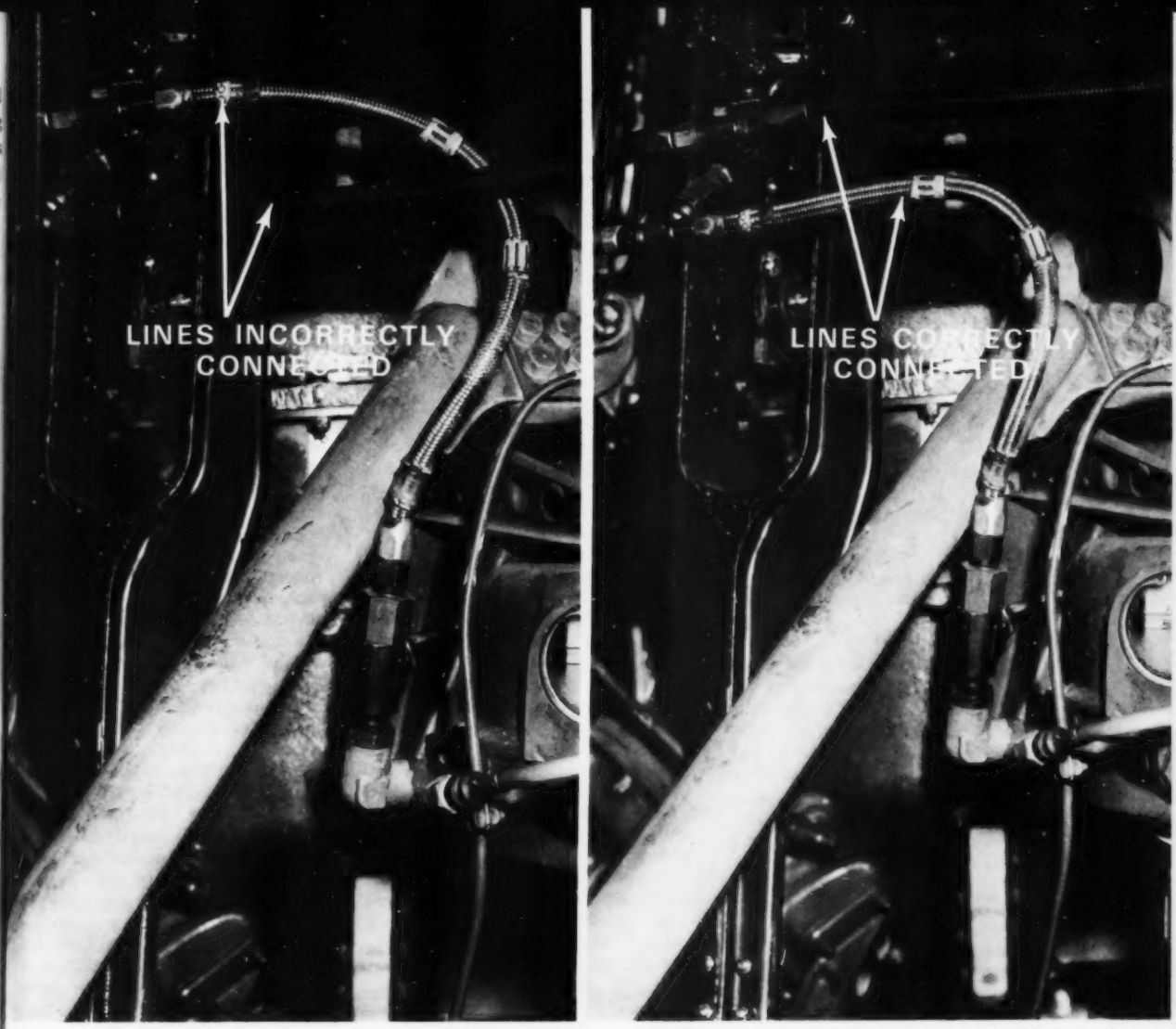
NON ANTI-SKID CAP

OVER ■ TURN

A MARINE LTCOL uttered an ancient one word expletive after he was helped out of debris resulting from a ground accident. It thoroughly described his sentiments as he surveyed what a minute previously had been an older model, but still operational, helicopter. He had volunteered to "mind the store" for a 30-minute ground turnup of the H-34 which had been necessitated by the installation of a new transmission. The rotors were turning and all was normal for 5-10 minutes. After operating on both servos and performing satisfactory control checks with the primary servo OFF he switched to BOTH and then AUX OFF. As he did this the collective violently snapped out of his hand up to the armpit position and the cyclic moved rapidly forward and into the right corner of the cockpit. Attempts to lower the collective were unsuccessful. He then tried to switch servos to BOTH but the violent motion of the aircraft prevented him from reaching the switch. The helicopter became airborne, rose about five feet, tucked nose down, turned about 90 degrees to the left and then rolled over on its starboard side. The pilot secured the engine and evacuated the aircraft through the copilot's window right behind an enlisted man who had occupied the copilot's seat during the turnup. The pilot and outside plane director received a few cuts and bruises but no one was seriously injured.

All symptoms described by the pilot and "copilot" were indicative of a stuck or inoperative servo pilot valve but investigation proved the valve was operating properly. With help of a Sikorsky Field Representative and other experienced personnel the cause was finally determined about 72 hours after the investigation commenced. A Murphy* existed. The hydraulic lines and fittings to the servos had been cross-connected. The pressure and return lines to the primary servos were reversed as shown in the photographs. The pilot valve was hydraulically locked in the full up position. During

*If an aircraft part can be installed incorrectly, someone will install it that way!



the investigation this condition was reproduced using a hydraulic power unit. When hydraulic pressure was applied to the servo unit the flight controls were forced to full deflection in a direction determined by the last input from the collective and cyclic controls. These hydraulic lines and fittings are not color-coded and can be cross-connected *at six different points.*

A complete rigging check and QA inspection had been made about two weeks prior to the accident and no discrepancies had been noted. During the ensuing period between the rigging and the mishap, maintenance personnel had worked in the vicinity of the rotor assembly bleeding the rotor brake, installing rotor blades and performing other minor maintenance. It is possible that someone disconnected the servo lines in order to facilitate the accomplishment of other tasks and inadvertently reconnected them improperly.

Prevention

In order to preclude this Murphy from happening again, the primary servo pressure and return line fittings have been color coded to match their respective "T" fittings and procedures have been established for performance of a QA inspection of the primary servo unit each time work is performed on and around the transmission deck/rotor head area. Additionally, a special UR was submitted recommending a change in the size of the couplings and/or the length of one of the lines. The present design of the servo lines makes it easy to connect them improperly and visual inspections can be misinterpreted as "proper" when in fact they are not. There have been many previous instances of this Murphy. *Would you believe more than half a dozen?* ◄

LETTERS

The man who smiles when things go wrong has probably thought of someone to blame.

Ace L.

The Better To Rescue You With

Imperial Beach – After reading your article, The Better To Rescue You With, (March '70 APPROACH) I think a second look should be taken before the Kaman penetrator and Billy Pugh Rescue Net are used exclusively by the helicopter combat rescue aircrewman. At some point there has been a serious communications breakdown. It would appear that there has not been enough research completed prior to the decision being implemented to use these two exclusively.

First, let us compare the Boyd seat with the Kaman penetrator for overwater rescue. The Boyd seat weighs approximately eight pounds while the Kaman penetrator weighs about 20 pounds. When either one of these rescue devices is used, the survivor stands a good chance of being injured seriously, especially with the Kaman penetrator because of its added weight. If the survivor is not wearing a protective helmet, especially in a high sea state, his chances of being injured increase 100 percent with either of these pieces of equipment. Dragging either the Boyd seat or the Kaman penetrator through the water, while attempting to position it near the survivor, can be frustratingly tricky. When attempting to effect an overwater pickup the survivor invariably and instinctively turns his face away from the helo's rotor wash. During this split second either the Boyd seat or Kaman penetrator could strike the survivor, possibly causing serious injury.

Now let's review a rescue employing "D"/"V" rings without any other assisting device. Whenever a man is in the water, rescue aircrewmen on the West Coast are instructed to enter the water to provide assistance. If the rescuee is a pilot wearing a torso harness, a D-ring is already integrated in his harness and this fact simplifies the procedure, *(i.e., hook him on, haul him up)*. In addition, the rescue aircrewman has a D-ring available on his swimmer's sling in the event an extra one is needed. By using just the rescue hook and D-rings a successful rescue can be made quickly and safely. For example, if the rescuee has an injured back and the aircrewman is using a D-ring, it is possible to keep the survivor straight and reduce the possibility of additional body harm. On the other hand, if the Kaman penetrator or Boyd seat is attached to the rescue cable and hook, this type rescue would not be possible. By putting the man on the seat and using straps, the aircrewman could aggravate any injuries the survivor might have. The Kaman penetrator was developed to be used for overland pickups and should continue to be utilized in that capacity. The D-ring pickup and rescue sling is the best overwater rescue device presently available.

I also think the use of the Billy Pugh Rescue Net for shipboard transfers or overwater pickups is a big mistake. The rescue sling being used today is one of the best pieces of equipment readily available in the supply system.

Let's examine more closely a shipboard personnel transfer by helicopter with the proposed exclusive use equipment. First, the Billy Pugh net is big and awkward to handle. The chance of guiding and placing the net exactly where the aircrewman wants it is next to impossible – especially when hovering over heavy seas or over a ship that is pitching and rolling. There is also the possibility of catching a bit . . . because of the size of the net and its construction. A man in the net for a shipboard transfer may sustain serious injury if riding in a sitting position instead of standing as with the rescue sling. When using the rescue sling for shipboard personnel transfer, the man being transferred can cushion the shock of impact with his legs if the ship's deck should suddenly shift toward him. If he were in the rescue net he would have no chance to protect himself whatsoever. On the other hand the rescue sling is small, compact and easy to position over a ship's deck or over water as the case may be. As for overwater pickups, again, we can go back to the D-ring and rescue sling method for both normal or unconscious rescues. This procedure is much simpler, more effective and easier.

The Billy Pugh Rescue Net should be eliminated from service as the B. P. penetrator was. I have never seen the rescue net used (except in training) in my nine years as a helicopter rescue aircrewman. The rescue net is taking up valuable space in helicopters which could otherwise be used for something more useful. Before the kapok rescue sling or Boyd seat is eliminated from service and replaced by the Billy Pugh net and Kaman penetrator, the rescue devices program should be reevaluated. More research should be accomplished along with some consultations with enlisted aircrewmen who are using this equipment. I think that the men who are actually using the equipment are the ones whose opinions are too often overlooked. The manufacturer normally turns to project officers and other high level administrators for their development guidelines rather than conferring with the men actually using the lifesaving rescue equipment. Perhaps it is time for a change.

Raymond A. Sykes, ADJ2
Rescue Aircrew Training Instructor
Helicopter Combat Support
Squadron Five

• Thanks for your honest and candid remarks. We are always delighted to hear from men in the fleet because for everyone of you who takes the time to write there are many others who mean to – but don't. Without repeating parts of the article in the March '70 issue of APPROACH we concur with many of your comments. Certain rescue devices which have been tried and proven over the years are not to be thrown away but will slowly disappear from the supply

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

system, i.e. the Navy won't purchase them anymore. Other devices will continue to be bought. There are so many different conditions which may exist in any rescue situation that it is almost impossible to cite one single device as the best. If this premise is acceptable then this must be one pretty good reason as to why there are several different rescue devices in the inventory. Locale is probably going to determine what devices you need to have aboard a rescue helo. For example, for combat SAR you wouldn't be caught without a Kaman penetrator; for routine personnel transfers you wouldn't be caught without a sling; for astronaut pickups you wouldn't be caught without a Billy Pugh Rescue Net.

You and all other rescue aircrewmen will be glad to know that NavAirSysCom maintains a continuous review of rescue devices – always looking, testing, trying to get something better for you to work with – and has recently decided to continue buying the sling. You also will be glad to hear that your letter has been made an enclosure to a NavSafeCen letter to NavAirSysCom. NavSafeCen has also recommended to NavAirSysCom that the rescue sling be continued as part of the minimum standard rescue/transfer equipment for Navy helicopters. Aircrew Systems Bulletin No. 146, Amendment No. 1 states that the helo rescue net may be used for personnel transfers as a last resort when other factors clearly outweigh the injury potential.

Round up all those skeptics in your outfit and make them pay off for telling you it wouldn't do any good to write.

Hear ye, Hear ye – the new autovon prefix for NavSafeCen is 690-XXXX. Give us a call!!

The Games People Play

FPO, New York – The severe funding cut has prompted some serious thinking about how we can best make up for the lack of flight time. Generally, safety is made up of many factors and one of the largest is experience – the more we operate the safer we get. If we cut down the flight time we are going to have to increase some of the other factors to keep our safety record from suffering. We feel that in many cases the lack of flight time can be made up for by a large increase in knowledge – in other words more ground training, etc. Anyway, to make the ground training more interesting (and thereby more effective) would be a welcome blessing and that is the reason for this informal letter. On our last Med Cruise, LT Ted Skinner adopted the television game Jeopardy to his NATOPS program and came up with a learning game that we played at AOMs. We played it a couple of times pitting crew against crew with the categories announced a few days in advance to allow the people to "bone up." Some examples of categories were hydraulics, AWG-10, Sidewinder, CCA and MIG-21. The winning crew in the squadron (after eliminations) was to be granted a 72 hour special liberty in the port of their choice. The response was fantastic. Everyone was shaking the dust off their NATOPS Manuals and some of the "slower" members of the squadron suddenly became NATOPS experts. The NATOPS "Jeopardy" game benefited not only the crews playing but also the rest of the squadron who were the audience. Everyone agrees that it was a tremendous learning device and their enthusiasm was rewarding. We had a light set-up so that the first crew to push a button could be determined – the electricians made it so that only the first crew's light would illuminate.

We don't know if we are violating any copyright laws (besides the TV show there is a Jeopardy game sold in toy stores) by playing NATOPS Jeopardy – probably not. In any case we feel that it is well worthwhile passing on to other squadrons. It put new life in our Safety and NATOPS programs and most people we have asked feel that it would be an excellent safety suggestion. Any other info on how we play, keep score, etc, can be obtained by dropping me a line.

LT W. C. Vaughn
Safety Officer
VF-103

• This is an outstanding idea for maintaining that razor's edge of readiness. APPROACH highly recommends such endeavors and would be pleased to hear what other units are doing along these lines. ◄

Play safe. Accidents *never* take vacations.

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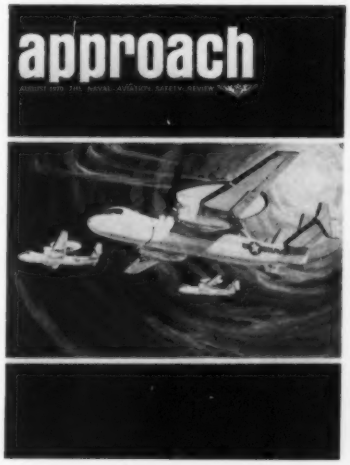

Vol. 16 **approach** No. 2

RADM W. N. Leonard
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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This month's cover painting Courtesy Grumman Aircraft Craig Kavafes of the E-2A *Hawkeye* truly reflects the Navy's pride in maintaining its aerial combat readiness at all times. APPROACH Diagrams on **Pg 21, 28, 29** by Don Lips. **Pg 27** Diagram courtesy Metropolitan Life Insurance Co.

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SUMMER

DO'S AND DON'TS

Be Alert.
Employ NATOPS.

Shun Low Passes Over Resort Areas.
Avoid Thunderstorms.
Fly Like A Pro.
Enjoy The Summer Season.

Become A Summertime Complacent.
Eliminate Items of Required Flight Clothing.

Stop Using Your Head.
Overexpose Yourself To The Sun.
Rum It Up Too Much.
Rob Yourself Of Needed Sleep.
You End Up A Statistic.

Save a Life, Save a Plane!

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